XEROX

Xerox Coax/Twinax (XCTO) Programmer Reference

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Changes are periodically made to this document. Technical updates will be included in subsequent editions.

Notice

This manual applies to the Xerox Coax/Twinax Option (XCTO) when it is installed on the Xerox 4213 Laser Printer.

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1. Introduction

Xerox Coax/Twinax Option (XCTO) provides a connection to IBM coaxial and twinaxial host systems. This option provides the following features:

- Laser printing
- Multiple font storage
- Automatic rule drawing
- Customised code mapping
- Printing of graphics
- Use of XES formatting commands.

By combining high-resolution character formation (300 by 300 dots per inch) with a wide variety of type styles (fonts), the user can produce documents that have a high-quality, professional appearance.

Generally, the Xerox Printing System operates much faster than the emulated printer and allows printing on a variety of input media including transparencies and labels. Some Xerox printers are able to print 2-sided and to feed envelopes.

To format the data, one can use an application programme on the host, which sends the IBM printer datastream commands and data. One can also modify programmes to send Xerox Escape Sequences (XES) that make full use of the advanced features offered by the Xerox Printing System.

Caution: When combining IBM printer and XES commands, particularly the reset command, E+XL, (carriage return and line feed) and those that move the current print position, always be aware of the new print position. Failure to consider this may give unexpected results, especially as the reset command resets the printer to the system defaults, including fonts and margins.

European EME regulations

The Xerox 4213 laser printer meets the requirements of EN55022 Class B.

WARNING: Use of controls, adjustments or performance of procedures other than those specified herein may result in a hazardous radiation exposure.

This product will produce ozone during normal operation. The ozone produced is dependent on copy volume and is heavier than air. Providing the proper environmental parameters as specified in Xerox installation procedures will ensure that concentration levels meet safe limits.

The 4213 has an ozone filter built into the print cartridge.

Laser safety

The following note is to meet the local requirements of Finland and Sweden.

LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

VAROITUS:
LAITTEEN KÄYTTÄMINEN MUULLA KUIN TÄSSÄ KÄYTTÖOHJEESSA MAINITULLA TAVALLA SAATTAA ALTISTAA KÄYTTÄJÄN TURVALLISUUSLUOKAN 1. YLITTÄVÄLLE LASERSÄTEILYLLE.

VARNING:
OM APPARATEN ANVÄNDS PÅ ANNAT SÄTT ÄN I DENNA BRUKSANSVISNING SPECFICERADE, KAN ANVÄNDAREN UTSÄTTAS FÖR O SYNLIG LASERSTRÄLNING, SOM ÖVERSKRIDER GRÄNSEN FÖR LASERKLASS 1.

How to use the *Xerox Coax/Twinax Option (XCTO) Programmer Reference*

This manual provides the host system programmer with a comprehensive reference to printing on the Xerox Printing System when both systems are connected to each other through the Xerox Coax/Twinax Option (XCTO).

Note: This manual does not address:

- Installation of the the Xerox Coax/Twinax Option on the Xerox Printing System—see the *Xerox 4213 Laser Printer User Guide* for details,
- Use of Xerox Escape Sequence (XES) commands,
- How to set parameters at the printer—see the *Xerox 4213 Laser Printer User Guide* for details,
- The whole coaxial or twinaxial environment—see the Host System documentation for details.

The manual contains:

Chapter 1: *Introduction*— Gives an overview of XCTO and this manual. Read this chapter before attempting to use the special features or IBM datastream commands.

Chapter 2: *Data stream commands*—Describes the IBM commands supported by XCTO.

Chapter 3: *Special features*—Explains the methods to access the IBM related special features which are available with the Xerox Printing System.

Chapter 4: *Applications*—Provides the most common methods for downloading fonts and graphics through the XCTO interface, and gives some examples of documents created using XES commands through the SCTO interface.

Chapter 5: *Fonts and character sets*—Describes font support and the relationship between IBM Global Font Identifiers (GFID) and Xerox fonts.

Chapter 6: *Error handling*—Describes how XCTO handles IBM error conditions. The Xerox Printing System *User Guide* describes how the Xerox Printing System presents error information.

Chapter 7: *Configuration and sysgen parameters*—Provides examples of configuring the Xerox printing system to function on the IBM host.

Appendix A: *Font and code set tables*—Contains tables of all the IBM code sets supported by XCTO.

Appendix B: *DSC option defaults*—Shows default DSC options for the IBM printers emulated and for the XCTO.

Appendix C: *Command summary*—Summarises in tables the IBM datastream *and* the XCTO special feature commands.

Appendix D: *4045 Model 20 emulation*—Describes how the 4045 Model 20 handles the Set Horizontal Format (SHF) and Set Vertical Format (SVF) commands.

Appendix E: *The Coax communications buffer*—Describes the memory area known as the communications buffer which is used by all coaxial emulations.

Conventions used in this manual

The following conventions are used throughout this manual:

Note: A note indicates information of interest that is related to the subject at hand.

WARNING: Warnings are associated with the safety of people.

Caution: Caution indicates necessary information to prevent equipment damage or undesirable effects.

Hexadecimal numbers are represented in the form X'69' or X'1C'.

The abbreviation “KB” refers to kilobytes.

The abbreviation “MB” refers to megabytes.

Related publications

Xerox manual title

Xerox 4213 Laser Printer User Guide
Xerox 4213 Laser Printer Install Sheet
Xerox 4213 Laser Printer XES Quick Reference Card
Xerox 4045/4046 Laser CP Model 20 User and Reference Manual

IBM manual title

IBM 3262 Printer Models 3413 component description
IBM 3268 printer models 2 & 2c description
IBM 3816 page printer setup instructions
IBM 4245 printer, models D12 and D20 information manual
IBM 6262 printer, models D12 and D14, product description

Hosts supported

When XCTO is installed on the Electronic Printing system it accepts commands and data from an IBM coax or twinax host. The following systems are typical of these hosts.

Coax hosts

- IBM 9370
- IBM 4381.

Twinax hosts

- IBM System 36
- IBM System 38
- IBM AS400.

Emulated printers

Within the physical limitations of the Xerox Printing System, XCTO carries out the functions and features of the emulated IBM printer. Supported coax and twinax printers are described in the rest of this chapter.

Coax printers

- IBM 3268 (Model 2)
- IBM 3262 (Models 3 and 13)
- IBM 3287 (Models 1 and 2)
- IBM 3812/3816 (in 3268 mode)
- IBM 4245 (Model D12 and D20)
- IBM 6262 (Model D12 and D14)
- Xerox 4045 Model 20.

IBM 3268

The 3268 dot-matrix printer has the following features:

- prints a maximum of 340 characters per second (cps)
- supports 10 and 16.7 characters per inch (cpi)
- supports 3, 4, 6 and 8 lines per inch (lpi) line spacing
- supports many different national character sets, and
- supports continuous forms of various sizes up to 6 parts thick.

IBM 3262

The 3262 band printer has the following features:

- prints a maximum of 650 lines per minute (lpm) depending on the band used
- supports only 10 characters per inch (cpi)
- supports 3, 4, 6 and 8 lines per inch (lpi) line spacing increments
- supports many different national character sets, providing between 48 and 128 characters, and
- supports continuous forms of various sizes up to 6 parts thick.

IBM 3287

The 3287 dot-matrix printer has the following features:

- prints a maximum of 120 characters per second (cps) depending on the print mode selected.
- supports only 10 characters per inch (cpi)
- supports 3, 4, 6 and 8 lines per inch (lpi) line spacing increments
- supports many different national character sets, providing between 48 and 128 characters, and
- supports continuous forms of various sizes up to 6 parts thick.

IBM 3812/3816

The 3812 page printer emulates the 3268 dot-matrix printer with the following features:

- prints a maximum of 12 pages per minute (ppm)
- supports 10, 12, 15, and 17.1 characters per inch (cpi)
- includes 70 proportionally-spaced and typographical standard fonts
- includes a floppy disk for system software and font storage
- supports 240 spots per inch (spi) resolution, and
- supports cut sheets of various sizes.

The 3816 has similar functionality but operates up to 24 pages per minute (ppm).

IBM 4245

The 4245 band printer has the following features:

- prints a maximum of 2000 lines per minute (lpm) depending on the number of characters on the band
- supports only 10 characters per inch (cpi)
- supports 3, 4, 6 and 8 lines per inch (lpi) line spacing increments
- supports various nationalised bands, providing between 48 and 142 characters, and
- supports continuous forms of various sizes up to 6 parts thick.

IBM 6262

The 6262 band printer has the following features:

- prints up to 1400 lines per minute (lpm) depending on the number of characters on the band
- supports only 10 characters per inch (cpi)
- supports 3, 4, 6 and 8 lines per inch (lpi) line spacing increments

- supports various nationalised bands, providing between 48 and 192 characters, and
- supports continuous forms of various sizes up to 6 parts thick.

The 6262 has a modern user interface supporting a two-line display with language support for English, German, French and Italian.

Xerox 4045 Model 20

The 4045 Model 20 provides SCS and DCS support similar to that provided by the IBM 3287 printer. In addition to this support it has special features to maximise the use of Xerox Escape Sequence (XES) commands.

Limitations

In the coax environment the following functions are not supported by the XCTO:

- BELL and chime poll (accepted but no alarm sounds)
- Colour
- Full IBM APL character set
- Function management headers
- Intelligent Printer Data Stream (IPDS)
- Katakana character set
- Programmed symbols
- Queries from the host.

Twinax printers

- IBM 5219 (Model D01 and D02)
- IBM 5224 (Model 1 and 2)
- IBM 5225 (Model 1 and 2)
- IBM 5256 (Model 1 to 3)
- IBM 3812 in 5219 mode

- IBM 4245 (Model T12 and T20)
- IBM 5262 (Model 1)
- IBM 6262 (Model T12 and T14).

IBM 5219

The 5219 daisywheel printer has the following features:

- prints at 24 to 38 characters per second (cps) depending on the print mode selected
- supports 10, 12, and 15 characters per inch (cpi) modes and proportional spacing.
- supports 4, 5.33, 6, 8, 9.6, and 12 lines per inch (lpi) line spacing increments
- supports numerous nationalised character sets and typefaces
- supports justification, tabs, automatic underlining, overstrike, subscript, and superscript enhancements, and
- supports cut-sheet, tractor feed, envelope and manual feed paper handling mechanisms.

IBM 5224

The 5224 dot-matrix line printer has the following features:

- prints 60 to 240 lines per minute (lpm) depending on the print mode
- supports 10 and 15 characters per inch (cpi) modes
- supports 4, 6, and 8 lines per inch (lpi) line spacing increments
- supports nationalised character sets providing 96 and 188 multinational characters, and
- supports continuous forms of various sizes.

IBM 5225

The 5225 dot-matrix line printer has the same capabilities as the 5224, except that its operating speed is between 90 and 400 lines per minute (lpm) depending on the print mode.

IBM 5256

The 5256 dot-matrix printer has the following features:

- prints up to 120 characters per second (cps)
- supports only 10 characters per inch (cpi)
- supports 6 and 8 lines per inch (lpi) line spacing increments
- supports nationalised character sets providing 96, 128, and 188 multinational characters, and
- supports continuous forms of various sizes.

IBM 3812/3816

The 3812 page printer operates at up to 12 pages per minute (ppm), and emulates the 5219 daisywheel printer with the following additional features:

- includes 70 proportionally-spaced and typographical standard fonts
- includes a floppy disk for system software and font storage
- supports 240 spots per inch (spi) resolution, and
- supports cut sheets of various sizes.

The 3816 has similar functionality but operates up to 24 pages per minute (ppm). When replacing a 3816 with a Xerox Printing System through the XCTO, use the 3812 emulation.

IBM 4245

The 4245 band printer has the following features:

- prints up to 2000 lines per minute (lpm) depending on the number of characters on the band
- supports only 10 characters per inch (cpi)
- supports 6 and 8 lines per inch (lpi) line spacing increments
- provides various nationalised bands ranging from 48 to 142 characters, and
- supports continuous forms of various sizes up to 6 parts thick.

IBM 5262

The 5262 band printer has the following features:

- prints up to 650 lines per minute (lpm) depending on the number of characters on the band
- supports only 10 characters per inch (cpi)
- supports 6 and 8 lines per inch (lpi) line spacing increments
- provides various nationalised bands ranging from 48 to 188 characters, and
- supports cut sheets of various sizes.

IBM 6262

The 6262 band printer has the following features:

- prints up to 1400 lines per minute (lpm) depending on the number of characters on the band
- supports 10 characters per inch (cpi) only
- supports 3, 4, 6 and 8 lines per inch (lpi) line spacing increments
- supports various nationalised bands, providing between 48 and 192 characters, and
- supports continuous forms of various sizes up to 6 parts thick.

The 6262 has a modern user interface supporting a two-line display with language support for English, German, French and Italian.

Limitations

In the Twinax environment, the following functions are not supported by the XCTO:

- BELL (accepted but no alarm sounds)
- Colour
- Intelligent Printer Data Stream (IPDS)
- Katakana character set
- Load alternate character.

Configuration

You may switch emulations using the printer control panel. When changing emulations, port switching is automatic, as the IBM printer emulations supported by XCTO do not function with the serial and parallel ports. The port switching capabilities enable all three ports (serial, parallel and IBM) to be connected at the same time and to be active according to the currently selected emulation.

You can reconfigure XCTO between coax and twinax. This and other configuration functions can be performed at the printer control panel. Changing between coax and twinax environments causes XCTO settings to be reset to factory defaults.

2. Datastream commands

The emulated IBM printers support a range of datastream commands. These commands may be implemented differently depending on whether the printer being emulated is attached by a coaxial or a twinaxial connection. *Not all commands are supported by all printers.* Some commands are ignored by certain models, while others are implemented within the technology restrictions imposed by the particular printer.

This chapter specifies:

- the range of printer commands
- if the commands are applicable in the coax or twinax environments, and
- which commands are supported on the different printer emulations.

The commands are used to control the formatting of the data to be printed.

Xerox Coax/Twinax Option (XCTO) supports the following types of command:

- DSC (Data Stream Compatible)
- DSE (Data Stream Emulation)
- SCS (SNA [Systems Network Architecture] Character String)
- DCA (Document Content Architecture).

Descriptions of the commands are presented in alphabetical order under two headings. The first is ”3270/DSC/DSE control codes.” The second is ”SCS and DCA datastream commands.” At the beginning of each section is a summary table of the commands in numeric order and a comparison table showing how the commands are supported for each emulation. Each table shows the page where the command description can be found.

Note: Error handling in XCTO is different from the IBM printers emulated. As such, the output may differ from that seen under similar circumstances on the IBM printer.

3270/DSC/DSE control codes

Table 2-1 shows the valid control codes while the coax printer emulations are in DSC/DSE mode.

Note: These codes have different meanings in formatted and unformatted modes.

In unformatted mode, the line length and carriage movement is controlled by NL, CR and EM control codes.

In formatted mode, the control codes NL, CR and EM are ignored. Lines are filled to the maximum line length (MPP); then an implicit new line is performed. Form Feed is valid in both modes, provided its position is valid.

Command summary

Table 2-1. **Command summary**

Code	Name	Page
X'00'	Null (NUL)	2-5
X'01'	End Of Message (EM)	2-4
X'02'	Form Feed (FF)	2-4
X'03'	New Line (NL)	2-5
X'04'	Stop (STOP)	2-5
X'05'	Carriage Return (CR)	2-4
X'06' and X'07'		2-6

Note: Some options apply only when the printer is in the DSC/DSE mode, and are not applicable to the twinax emulation. Refer to chapter 3, “Special features,” to check the commands’ corresponding DSC Options.

Comparison of DSC/DSE commands (coax)

Table 2-2 lists the DSC/DSE commands that XCTO handles for the various printers emulated.

Y = Supported as described in this manual.

Table 2-2. **DSC/DSE command comparison**

DSC/DSE Command	3262	3268	3287	3812 (3268)	4245	6262	4045 Mod 20
X'CR 05' (page 2-3)	Y	Y	Y	Y	Y	Y	Y
X'EM 01' (page 2-4)	Y	Y	Y	Y	Y	Y	Y
X'FF 02' (page 2-4)	Y	Y	Y	Y	Y	Y	Y
X'NL 03' (page 2-4)	Y	Y	Y	Y	Y	Y	Y
X'NULL 00' (page 2-5)	Y	Y	Y	Y	Y	Y	Y
X'STOP 04' (page 2-5)	Y	Y	Y	Y	Y	Y	Y
X'06' (page 2-5)	Y	Y	Y	Y	Y	Y	Y
X'07' (page 2-5)	Y	Y	Y	Y	Y	Y	Y

Carriage Return (CR)

X'05'

Where:

05	The control sequence of the Carriage Return command

This control code causes the printer to move to the left margin of the current line in an unformatted print field. In a formatted print field or unformatted nonprint field, this control code is printed as a space character. In a formatted nonprint field, it is printed as a null character.

End of Message (EM)

X'01'

Where:

01	The control sequence of the End Of Message command

In an unformatted print field, this control code stops the printer from printing. In a formatted print field or unformatted nonprint field, this control code is printed as a space character. In a formatted nonprint field, it is printed as a null character.

Form Feed (FF)

X'02'

Where:

02	The control sequence of the Form Feed command

This control code causes the printer to move to the top margin of the next form. This movement occurs in both print and non-print fields, and formatted or unformatted modes.

New Line (NL)

X'03'

Where:

03	The control sequence of the New Line command

This control code causes the printer to move to the field position of the next line in an unformatted print field. In a formatted print field or unformatted nonprint field, this control code is printed as a space character. In a formatted nonprint field, it is printed as is a null character.

Null (NUL)

X'00'

Where:

00	The control sequence of the Null command

This control code does not cause any printer function. In unformatted mode, the printer treats this code as a space for both print and nonprint fields. In formatted print or nonprinted fields, a null character is printed.

Stop (STOP)

X'04'

Where:

04	The control sequence of the Stop command

This control code in an unformatted print field, unformatted nonprint field or a formatted print field is printed as a space character. In a formatted nonprint field, it is printed as a null character.

On receipt of this command the 4045 Model 20 emulation prints a space.

X'06' and X'07' codes

Where:

06 **07**	The control sequence of the Space or Null command

These control codes in an unformatted print field, unformatted nonprint field or a formatted print field are printed as a space character. In a formatted nonprint field, they are printed as a null character.

On receipt of these commands the 4045 Model 20 emulation prints a space.

SCS and DCA datastream commands

The following control codes are valid while printer emulations are in SCS and/or DCA mode. In the twinax environment (5250), SCS and DCA commands can be mixed (no mode switching occurs).

Some of the commands are not supported in one or other of the mediums; for example, Vertical Channel Select is not supported on twinax. When a command is supported for one medium, it is identified in the heading of the detailed command description. It should be noted that there is no differentiation made between SCS and DCA commands described below. This, however, is made in the Command Support Comparison tables which follow the command summary.

Command format

The commands are a variable length string of hexadecimal characters. Some commands require parameters; others do not. The command string structure is in the following format:

Control sequence prefix	Class	Count	Control type code	Parameter(s)

Where:

Control sequence prefix	A one-byte value defined in EBCDIC.
Class	A one-byte value defined in EBCDIC which designates a group of SCS extended controls that have a common purpose or attribute. The following classes have been assigned. D1 = Codes and character set controls D2 = Sequential character and/or printer positioning controls D3 = Paginating, text positioning and process controls.
Count	A one-byte binary count of the number of bytes in the remainder of this control, including the byte itself.
Control type code	A one-byte binary number that designates a specific control function.
Parameter(s)	The parameter or parameters, defined in hexadecimal, that contain the control settings. Where a string of parameters are defined, a series of periods (...) are shown between the first and last parameter.

Notes: If an optional parameter or part of an optional parameter is excluded from the count, that parameter is not set. This means that the count is used as specified.

If the count exceeds the number of parameters, an error type 4 in DCA or Invalid Command in SCS occurs because the missing parameters are considered to be unsupported.

If the count field excludes a required parameter an error type 3 in DCA or Invalid Parameter in SCS occurs.

Example: **X'2BD2nn03rerepr' - Justify Text Field (JTF)**

Where:

2B	The control sequence prefix of the Justify Text Field command
D2	The command class for the Justify Text Field command
nn	The number of bytes in the control string including the byte count itself (5 in this example)
03	The control type for the Justify Text Field command
rere	A two-byte number specifying the horizontal position in 1/1440ths of an inch relative to the left margin to which the text will be justified
pr	A one-byte number which specifies the percentage rule for justification.

Command summary

Table 2-3. **Commands common to coax and twinax**

Code	Name	Page
X'00'	Null	2-41
X'05'	Horizontal Tab (HT)	2-35
X'0C'	Form Feed (FF)	2-34
X'0D'	Carriage Return (CR)	2-30
X'15'	New Line (NL)	2-40
X'16'	Back Space (BS)	2-25
X'1E'	Interchange Record Separator (IRS)	2-37
X'25'	Line Feed (LF)	2-39
X'27'	Escape (ESC)(4045 Model 20 emulation only)	2-33
X'2F'	Bell (BEL)	2-30
X'35nn'	Transparent (TRN)	2-85
X'3F'	Substitute (SUB)	2-84
X'40'	Space (SP)	2-83
X'FF'	Eight Ones (EO)	2-30

Table 2-4. **Coax commands**

Code	Name	Page
X'04vv'	Vertical Channel Select (VCS)	2-86
X'08gg'	Graphic Escape (GE)	2-34
X'0B'	Vertical Tab (VT)	2-87
X'14'	Enable Presentation (ENP)	2-31
X'24'	Inhibit Presentation (INP)	2-36
X'28ttvv'	Set Attribute (SA)	2-49
X'2BC1nnhhlm rmt1....tn'	Set Horizontal Format (SHF)	2-59
X'2BC2nnvvtmbmt1 ...tn'	Set Vertical Format (SVF)	2-79
X'2BC6nnld'	Set Line Density (SLD)	2-71
X'2BC803grop'	Set Graphic Error Action (SGEA)	2-57
X'2BD10683xx002D 00'	Set Text Orientation (STO)	2-77
X'2BD2nn2900 cp'	Set Print Density (SPD)	2-74
X'2BD2nn48xxxxxxs ddoddxxxxxx'	Page Presentation Media (PPM)	2-42
X'36'	Xerox Transparent (TRN)	2-88

Table 2-5. **Twinax commands**

Code	Name	Page
X'06'	Required New Line (RNL)	2-48
X'09'	Superscript (SPS)	2-84
X'0A'	Repeat (RPT)	2-47
X'1A'	Unit Backspace (UBS)	2-86
X'23'	Word Underscore (WUS)	2-87
X'2A'	Switch (SW)	2-85
X'2BC1nnhh'	Set Horizontal Format (SHF)	2-61
X'2BC2nnvv'	Set Vertical Format (SVF)	2-79
X'2BC6nnld'	Set Line Density (SLD)	2-71
X'2BC8nngguu'	Set Graphic Error Action (SGEA)	2-58
X'2BD1028E'	End Emphasis (EE)	2-31
X'2BD10381id'	Set Coded Graphic Character Set Through Local ID (SCGL)	2-51
X'2BD1038Abd'	Begin Emphasis (BE)	2-25
X'2BD10601gcgccpcp'	Set GCGID Through GCID (SCG)	2-56
X'2BD10705gfgffwfwfa'	Set FID Through GFID (SFG)	2-55
X'2BD2020B'	Release Left Margin (RLM)	2-47
X'2BD20307il'	Set Indent Level (SIL)	2-65
X'2BD20309ls'	Set Line Spacing (SLS)	2-72

Table 2-5. **Twinax commands** (continued)

Code	Name	Page
X'2BD20345si'	Set Initial Conditions (SIC)	2-65
X'2BD2042900 CP'	Set Character Density (SCD)	2-50
X'2BD20415ldld'	Set Single Line Distance (SSLD)	2-76
X'2BD2nn01ffal tabs'	Set Horizontal Tab (STAB)	2-63
X'2BD2nn03 rerepr'	Justify Text Field (JTF)	2-37
X'2BD2nn0Dstpr'	Set Justify Mode (SJM)	2-68
X'2BD2nn11lmlmrm rm'	Set Horizontal Margins (SHM)	2-62
X'2BD2nn40wd wddpdp'	Set Presentation Page Size (SPPS)	2-73
X'2BC6nnld'	Set Line Density (SLD)	2-71
X'2BC8nngguu'	Set Graphic Error Action (SGEA)	2-58
X'2BD1028E'	End Emphasis (EE)	2-31
X'2BD10381id'	Set Coded Graphic Character Set Through Local ID (SCGL)	2-51
X'2BD1038Abd'	Begin Emphasis (BE)	2-25
X'2BD10601gcgccpc p'	Set GCGID Through GCID (SCG)	2-56
X'2BD10705gfgffwf wfa'	Set FID Through GFID (SFG)	2-55
X'2BD2020B'	Release Left Margin (RLM)	2-47

Table 2-5. **Twinax commands** (continued)

Code	Name	Page
X'2BD20307il'	Set Indent Level (SIL)	2-65
X'2BD20309ls'	Set Line Spacing (SLS)	2-72
X'2BD20345si'	Set Initial Conditions (SIC)	2-65
X'2BD2042900 CP'	Set Character Density (SCD)	2-50
X'2BD20415ldld'	Set Single Line Distance (SSLD)	2-76
X'2BD2nn01ffal tabs'	Set Horizontal Tab (STAB)	2-63
X'2BD2nn03 rerepr'	Justify Text Field (JTF)	2-37
X'2BD2nn0Dstpr'	Set Justify Mode (SJM)	2-68
X'2BD2nn11lmlmrm rm'	Set Horizontal Margins (SHM)	2-62
X'2BD2nn40wd wddpdp'	Set Presentation Page Size (SPPS)	2-73
X'2BD2nn48xxxxfcs ddoddqqdx'	Page Presentation Media (PPM)	2-44
X'2BD2nn49tm tmbmbm'	Set Vertical Margins (SVM)	2-82
X'2BD2nn4Cxxpfxxs i'	Set Printer Set up (SPSU)	2-75
X'2BD2nn85 ecac'	Set Exception Action (SEA)	2-52
X'2BD3nnF6caca lala'	Set Text Orientation (STO)	2-78
X'2BD4020E'	End Underscore (EUS)	2-33

Table 2-5. **Twinax commands** (continued)

Code	Name	Page
X'2BD40276'	End Overstrike (EOS)	2-32
X'2BD4nn0A01 bp'	Begin Underscore (BUS)	2-28
X'2BD4nn72ch bpgcgccpcp'	Begin Overstrike (BOS)	2-26
X'2BFEnnmmee i1----in'	Load Alternate Characters (LAC)	2-39
X'33'	Index Return (IRT)	2-36
X'344Crv'	Relative Vertical Presentation Position (RVPP)	2-46
X'34C0ah'	Absolute Horizontal Presentation Position (AHPP)	2-23
X'34C4av'	Absolute Vertical Presentation Position (AVPP)	2-24
X'34C8rh'	Relative Horizontal Presentation Position (RHPP)	2-45
X'36'	Numeric Backspace (NBS)	2-41
X'38'	Subscript (SBS)	2-83
X'39'	Indent Tab (IT)	2-35
X'3A'	Required Form Feed (RFF)	2-48
X'6D'	Word Underscore (US)	2-87
X'E1'	Expanded Space—Numeric Space (NSP)	2-34

Comparison tables

Tables 2-6 and 2-7 show the commands supported by the different emulations for SCS. Common commands are shown on both SCS tables. DCA table 2-8 shows those commands available to twinax printers.

Comparison of SCS commands (coax)

Table 2-4 shows how XCTO handles the SCS commands for the coax printer emulations shown.

Y = supported as described in this manual
N = not supported—reported as an error
A = accepted but results in no operation.

Table 2-6. **SCS coax commands**

SCS command	3262	3268	3287	3812/16 (3268)	4245	6262	4045 Model 20
Back Space X'16' (page 2-25)	Y	Y	Y	Y	Y	Y	Y
BEL X'2F' (page 2-30)	A	A	A	A	A	A	A
Carriage Return X'0D' (page 2-30)	Y	Y	Y	Y	Y	Y	Y
Eight Ones X'FF' (page 2-30)	Y	Y	Y	Y	Y	Y	Y
Enable Presentation X'14' (page 2-31)	A	A	A	A	Y	A	A
Escape X'27' (page 2-33)	Y	Y	Y	Y	Y	Y	Y
Form Feed X'0C' (page 2-34)	Y	Y	Y	Y	Y	Y	Y

Table 2-6. **SCS coax commands** (continued)

SCS command	3262	3268	3287	3812/16 (3268)	4245	6262	4045 Model 20
Graphic Escape X'08gg' (page 2-34)	Y	Y	Y	Y	N	Y	Y
Horizontal Tab X'05' (page 2-35)	Y	Y	Y	Y	Y	Y	Y
Inhibit Presentation X'24' (page 2-36)	A	A	A	A	Y	A	A
Interchange Record Separator X'1E' (page 2-37)	Y	Y	Y	Y	Y	Y	Y
Line Feed X'25' (page 2-39)	Y	Y	Y	Y	Y	Y	Y
New Line X'15' (page 2-40)	Y	Y	Y	Y	Y	Y	Y
Null X'00' (page 2-41)	Y	Y	Y	Y	Y	Y	Y
Page Presentation Media X'2BD2nn48xxxxxxsddoddxxxxxx' (page 2-42)	N	N	N	Y	N	N	N
Required Space X'41' (page 2-48)	Y	Y	Y	Y	Y	Y	Y
Set Attribute X'28ttw' (page 2-49)	N	Y	Y	Y	N	Y	Y
Set Graphic Error Action X'2BC803grop' (page 2-57)	N	N	N	N	Y	N	N
Set Horizontal Format X'2BC1nnhhlmrmt1..tn' (page 2-59)	Y	Y	Y	Y	Y	Y	Y
Set Line Density X'2BC6nnld' (page 2-70)	Y	Y	Y	Y	Y	Y	Y

Table 2-6. **SCS coax commands** (continued)

SCS command	3262	3268	3287	3812/16 (3268)	4245	6262	4045 Model 20
Set Print Density X'2BD2nn2900cp' (page 2-74)	N	Y	N	Y	N	Y	N
Set Text Orientation X'2BD10683xx002D00' (page 2-77)	N	N	N	A	N	N	N
Set Vertical Format X'2BC2nnvvtmbmt1..tn' (page 2-79)	Y	Y	Y	Y	Y	Y	Y
Space X'40' (page 2-83)	Y	Y	Y	Y	Y	Y	Y
Transparent X'35nn' (page 2-85)	Y	Y	Y	Y	Y	Y	Y
Vertical Channel Select X'04vv' (page 2-86)	Y	Y	Y	Y	Y	Y	Y
Vertical Tab X'0B' (page 2-87)	Y	Y	Y	Y	Y	Y	Y
Xerox Transparent X'36' (page 2-88)	Y	Y	Y	Y	Y	Y	Y

Note: In 4045 Model 20 emulation invalid and/or commands not accepted are ignored and no error is reported. All other emulations report errors appropriate to the error condition that occurs.

Comparison of SCS commands (twinax)

Table 2-7 shows how XCTO handles the SCS commands for the twinax printer emulations shown. Table 2-8 shows how XCTO handles the DCA commands for the twinax printer emulations shown

Y = supported as described in this manual
N = not supported—reported as an error
A = accepted but results in no operation.

Table 2-7. **SCS twinax commands**

SCS command	3812 (5219)	4245	5219	5224	5225	5256	5262	6262
Absolute Horizontal Presentation Position X'34C0ah' (page 2-23)	Y	Y	Y	Y	Y	Y	Y	Y
Absolute Vertical Presentation Position X'34C4av' (page 2-24)	Y	Y	Y	Y	Y	Y	Y	Y
Back Space X'16' (page 2-25)	Y	N	Y	N	N	N	N	N
BEL X'2F' (page 2-30)	A	A	A	A	A	A	A	A
Carriage Return X'0D' (page 2-30)	Y	Y	Y	Y	Y	Y	Y	Y
Eight Ones X'FF' (page 2-30)	Y	Y	Y	Y	Y	Y	Y	Y
Form Feed X'0C' (page 2-34)	Y	Y	Y	Y	Y	Y	Y	Y
Horizontal Tab X'05' (page 2-35)	Y	N	Y	N	N	N	N	N
Interchange Record Separator X'1E' (page 2-37)	Y	Y	Y	Y	Y	Y	Y	Y

Table 2-7. **SCS twinax commands** (continued)

SCS command	3812 (5219)	4245	5219	5224	5225	5256	5262	6262
Line Feed X'25' (page 2-39)	Y	Y	Y	Y	Y	Y	Y	Y
Load Alternate Characters X'2BFEnnmmeei1... in' (page 2-39)	N	N	N	A	A	N	N	N
New Line X'15' (page 2-40)	Y	Y	Y	Y	Y	Y	Y	Y
Null X'00' (page 2-41)	Y	Y	Y	Y	Y	Y	Y	Y
Page Presentation Media (PPM) X'2BD2nn48xxxxfcsddoddqqdx' (page 2-44)	Y	N	Y	N	N	N	N	N
Relative Horizontal Presentation Position X'34C8rh' (page 2-45)	Y	Y	Y	Y	Y	Y	Y	Y
Relative Vertical Presentation Position X'344Crv' (page 2-46)	Y	Y	Y	Y	Y	Y	Y	Y
Set Character Density X'2BD2042900cp' (page 2-50)	Y	Y	Y	Y	Y	N	N	Y
Set Coded Graphic Character Through Local ID X'2BD10381id' (page 2-51)	Y	N	Y	Y	Y	N	N	N
Set Graphic Error Action X'2BC8nngguu' (page 2-58)	Y	Y	Y	Y	Y	Y	Y	Y
Set Horizontal Format X'2BC1nnhh' (page 2-61)	Y	Y	Y	Y	Y	Y	Y	Y

Table 2-7. **SCS twinax commands** (continued)

SCS command	3812 (5219)	4245	5219	5224	5225	5256	5262	6262
Set Line Density X'2BC6nnld' (page 2-71)	Y	Y	Y	Y	Y	N	Y	Y
Set Text Orientation X'2BD3nnF6cacalala' (page 2-78)	Y	N	Y	N	N	N	N	N
Set Vertical Format X'2BC2nnvv' (page 2-81)	Y	Y	Y	Y	Y	Y	Y	Y
Space X'40' (page 2-83)	Y	Y	Y	Y	Y	Y	Y	Y
Switch X'2A' (page 2-85)	Y	N	Y	N	N	N	N	N
Transparent X'35nn' (page 2-85)	Y	Y	Y	Y	Y	Y	Y	Y

Comparison of DCA commands

Table 2-8 shows the additional commands available to the twinax printer emulations shown for the Final Form Text capable printers.

Y = supported as described in this manual
N = not supported—reported as an error.

Table 2-8. **DCA twinax commands**

DCA command	3812/16 (5219)	5219
Begin Emphasis X'2BD1038Abd' (page 2-25)	Y	Y
Begin Overstrike X'2BD4nn72chbpgcgccpcp' (page 2-26)	Y	Y
Begin Underscore X'2BD4nn0A01bp' (page 2-28)	Y	Y
End Emphasis X'2BD1028E' (page 2-31)	Y	Y
End Overstrike X'2BD40276' (page 2-32)	Y	Y
End Underscore X'2BD4020E' (page 2-33)	Y	Y
Expanded Space X'E1' (page 2-34)	Y	Y
Indent Tab X'39' (page 2-35)	Y	Y
Index Return X'33' (Not standard DCA) (page 2-36)	Y	Y
Justify Text Field X'2BD2nn03rerepr' (page 2-37)	Y	Y
Numeric Backspace X'36' (Not standard DCA) (page 2-41)	Y	Y
Release Left Margin X'2BD2020B' (page 2-47)	Y	Y
Repeat X'0A' (Not standard DCA) (page 2-47)	Y	Y

Table 2-8. **DCA twinax commands** (continued)

DCA command	3812/16 (5219)	5219
Required Form Feed X'3A' (page 2-48)	Y	Y
Required New Line X'06' (page 2-48)	Y	Y
Required Space X'3A' (page 2-48)	Y	Y
Set Exception Action X'2BD2nn85ecac' (page 2-52)	Y	Y
Set FID Through GFID X'2BD10705gfgffwfwfa' (page 2-55)	Y	Y
Set GCGID Through GCID X'2BD10601gcgccpcp' (page 2-56)	Y	Y
Set Horizontal Margins X'2BD2nn11lmlmrmrm' (page 2-62)	Y	Y
Set Horizontal Tab X'2BD2nn01ffaltabs' (page 2-63)	Y	Y
Set Indent Level X'2BD10307il' (page 2-65)	Y	Y
Set Initial Conditions X'2BD20345si' (page 2-65)	Y	Y
Set Justify Mode X'2BD2nn0Dstpr' (page 2-68)	Y	Y
Set Line Spacing X'2BD20309ls' (page 2-72)	Y	Y
Set Presentation Page Size X'2BD2nn40wdwddpdp' (page 2-73)	Y	Y
Set Printer Setup X'2BD2nn4Cxxpfxxsi' (page 2-75)	Y	Y

Table 2-8. **DCA twinax commands** (continued)

DCA command	3812/16 (5219)	5219
Set Single Line Distance X'2BD20415ldld' (page 2-76)	Y	Y
Set Text Orientation X'2BD3nnF6cacalala' (page 2-78)	Y	Y
Set Vertical Margins X'2BD2nn49tmtmbmbm' (page 2-82)	Y	Y
Subscript X'38' (page 2-83)	Y	Y
Substitute X'3F' (page 2-84)	Y	Y
Superscript X'09' (page 2-84)	Y	Y
Unit Backspace X'1A' (page 2-86)	Y	Y
Word Underscore X'23' (page 2-87)	Y	Y

Command description

Absolute Horizontal Presentation Position (AHPP) (twinax only)

X'34C0ah'

Moves the print position horizontally to the ah position.

Where:

34	The control sequence prefix of the Absolute Horizontal Presentation Position command
C0	The command class for the Absolute Horizontal Presentation Position command
ah	The horizontal print position in characters. Valid values of ah range from 0 to maximum print position. If ah is less than the current print position, a carriage return followed by a horizontal movement to the position specified by ah occurs. The vertical position always stays unchanged. A value of 0 for ah causes no operation to occur. A value greater than line length causes an invalid SCS parameter check or an error type 4.

Absolute Vertical Presentation Position (AVPP) (twinax only)

X'34C4av'

Moves the print position vertically to the line specified by av.

Where:

34	The control sequence prefix of the Absolute Vertical Presentation Position command
C4	The command class for the Absolute Vertical Presentation Position command
av	The vertical print position in lines. Valid values of av range from 0 to the form's length. The horizontal position is not changed by this command. If the av value is less than the current line, the forms move to the specified line on the next page. A value of 0 for av causes no operation to occur. A value greater than form length causes an invalid SCS parameter check or an error type 4.

Back Space (BS)

X'16'

Causes the print position to be moved left by the current character width, ignoring the left margin, unless this movement goes left of the left edge of the physical page. In this case, the print position is moved to column one, the left edge.

The twinax 5219 and 3812 emulations report an error type 2 if this case occurs. The 5219 emulation can move only left of the left margin if this margin is released. If the left margin is not released the print position moves to the left margin without reporting an error.

The 4045 Model 20 emulation executes only the Back Space command if it occurs at the left margin.

Where:

16	The control sequence of the Back Space command

Begin Emphasis (BE) (twinax only)

X'2BD1038Abd'

This command is the starting control of a pair which identify the text to be emphasised. The ending control of the pair is the End Emphasis command. Once activated, bolding continues until it is terminated by the End Emphasis command, a Set Initial Conditions (SIC) command, or the end of the document (Clear command received).

Where:

2B	The control sequence prefix of the Begin Emphasis command
D1	The command class for the Begin Emphasis command
03	The number of bytes in the command string including the byte count itself.
8A	The control type for the Begin Emphasis command
bd	The optional one-byte number determines the type of emphasis to be applied. Valid values are X'01' or X'02'. All other values are invalid and cause an error type 4 to occur.

Note: Two BE commands without an EE, SIC or Clear command between them causes an error type 1.

Begin Overstrike (BOS) (twinax only)

X'2BD4nn72chbpgcgccpcp'

Makes the contiguous overstrike function active. Once BOS is activated, it stays activated until terminated by an End Overstrike (EOS) command, a Set Initial Conditions (SIC) command, or the end of the document (Clear command received).

Where:

2B	The control sequence prefix of the Begin Overstrike command
D4	The command class for the Begin Overstrike command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'03' -X' 08'; all others cause an error type 3.
72	The control type for the Begin Overstrike command
ch	A one-byte number which selects the code point for the overstrike character. This is valid as long as it is part of the currently selected character set and within the range X'40' - X'FF'. Invalid code point selection causes an error type 2.
bp	An optional one-byte number (Bypass parameter) that determines if white space is overstruck. White space on any line resulting from Horizontal Tab or Indent Tab and Absolute Horizontal Presentation Position commands is not overstruck. White space resulting from numeric space or required space is always overstruck. White space resulting from Space or Relative Horizontal Presentation Position commands is overstruck if the bypass parameter is X'00' (default) or X'01', and is not if it is X'80'. **Note:** Required Space and Numeric Space are treated as printable graphics.
gcgc	A pair of two-byte numbers which must be zero; otherwise an error type 4 occurs.
cpcp	A pair of two-byte numbers which must be zero; otherwise an error type 4 occurs.

Notes The first graphic print position after this command defines the start point of overstriking. Vertical position commands—line feed, new line, required new line, carriage return, interchange record separator, form feed, required form feed, auto new line function and AutoPage function end overstriking for that line. Overstriking is resumed automatically on the next line.

The 5219 emulation only overstrikes at baseline. The 3812 emulation overstrikes at baseline, superscript, and subscript levels.

Two BOS commands without an EOS, SIC, or Clear command between them cause an error type 1.

Begin Underscore (BUS) (twinax only)

X'2BD4nn0A01bp'

Activates continuous underscore. This command is the starting control (of a pair of controls) that identifies text that is to be underscored. The ending control of the pair is End Underscore (EUS). BUS stays activated until it is terminated by an EUS command, a Set Initial Conditions (SIC) command, or the end of the document.

Where:

2B	The control sequence prefix of the Begin Underscore command
D4	The command class for the Begin Underscore command
nn	The number of bytes in the command string including the byte count itself. Valid values are 03H and 04H; all others cause an error type 3.
0A	The control type for the Begin Underscore command
01	A required parameter which must be 01
bp	An optional one-byte number (bypass parameter) to specify if white space is underscored. White space on any line resulting from Horizontal Tab, Indent Tab, and Absolute Horizontal Presentation Position commands is not underscored. White space resulting from numeric space or required space is always underscored. White space resulting from Space or Relative Horizontal Presentation Position commands is underscored if the bypass parameter is X'00' (default) or X'02', and is not if it is X'80'. **Note:** Required Space and Numeric Space are treated as printable graphics.

Note: The 5219 emulation underscores at baseline only, while the 3812 emulation underscores super and subscript too. The first graphic print position after this command defines the start point of underscoring. Vertical position commands—line feed, new line, required newline, carriage return, interchange record separator, form feed, required form feed, auto new line functions and auto page functions end underscoring for that line. Underscoring is automatically resumed on the next line. Two BU commands without an EUS, SIC, or Clear command between them causes an error type 1.

Bell (BEL)

X'2F'

Turns on the attention indicator to show that operator action is required and sounds the alarm if it is not disabled. The printer stops and waits for operator attention. (This facility is currently not implemented.)

Where:

2F	The control sequence of the Bell command

Carriage Return (CR)

X'0D'

Moves the print position to the first position on the same line. If already at the first position, this command is ignored. The print position is moved to the effective left margin of those printers which support the Set Horizontal Margin command.

Where:

0D	The control sequence of the Carriage Return command

Eight Ones (EO)

X'FF'

This code is treated as an unprintable graphic character. For more information on unprintable graphic characters, refer to Set Graphic Exception Action (SGEA) later in this chapter.

Where:

FF	The control sequence of the Eight Ones command

Enable Presentation (ENP) (coax only)

X'14'

This command is used in conjunction with the Inhibit Presentation command. Any printable characters between INP and ENP commands are translated to spaces. SCS control codes between INP and ENP can cause unpredictable results.

Note: The 4245 emulation carries out the actions described above; all other emulations ignore this command.

Where:

14	The control sequence of the Enable Presentation command

End Emphasis (EE) (twinax only)

X'2BD1028E'

Stops the continuous emphasis function.

Two End Emphasis commands without a Begin Emphasis, Set Initial Conditions, or Clear command causes an error type 1.

Where:

2B	The control sequence prefix of the End Emphasis command
D1	The command class for the End Emphasis Field command
02	The number of bytes in the command string including the byte count itself
8E	The control type for the End Emphasis Field command

End Overstrike (EOS) (twinax only)

X'2BD40276'

Stops the continuous overstrike function.

Two End Overstrike commands without a Begin Overstrike, Set Initial Conditions, or Clear command between them causes an error type 1.

Where:

2B	The control sequence prefix of the End Overstrike command
D4	The command class for the End Overstrike Field command
02	The number of bytes in the command string including the byte count itself
76	The control type for the End Overstrike Field command

End Underscore (EUS) (twinax only)

X'2BD4020E'

Stops the continuous underscore function.

Two End Underscore commands without a Begin Underscore, Set Initial Conditions, or Clear command causes an error type 1.

Where:

2B	The control sequence prefix of the End Underscore command
D4	The command class for the End Underscore Field command
02	The number of bytes in the command string including the byte count itself
0E	The control type for the End Underscore Field command

Escape (ESC) (4045 Model 20 emulation only)

X'27'

The escape character code signals to the 4045 Model 20 emulation that the next characters are commands or host inserted information, and *not* printable data. The byte that follows the E code either describes the command, indicates the number of characters, or both. The command is frequently ended by a L sequence which tells the printer to print the data that follows.

For all other emulations, this command is treated as an unprintable graphic character.

Note: This is not an IBM control code.

Where:

27	The control sequence of escape code

Expanded Space—Numeric Space (NSP) (twinax only)

X'E1'

Prints as a space. On the 5219 and 3812 emulations this space cannot be increased/decreased during justification. In Proportional Space Mode (PSM) the width of the space is the same as the width of the numeric digit graphics.

Where:

E1	The control sequence of the End Expanded Space—Numeric Space command

Form Feed (FF)

X'0C'

Moves the print position to top line and left margin of next form as specified by the Set Vertical Format command. If this is not specified, the maximum print line is set to an appropriate default.

Note: For the 3812, and 5219 emulations, if the maximum page length is set to 1, the Form Feed command causes a new line to occur. Any other page length causes the printer to eject the current page on receipt of a form feed.

Where:

0C	The hex value of the Form Feed command

Graphic Escape (GE) (coax only)

X'08gg'

Allows APL/Text characters to be sent in an SCS datastream. Each APL/Text character in the datastream is preceded by a GE.

Where:

08	The control sequence of the Graphic Escape command
gg	A single-byte character between X'40' and X'FE' that defines the APL code point for the character.

When GE is supported and is followed by another control code (X'00' through X'3F' and X'FF') the two bytes (08gg) are treated as one invalid SCS command and cause a single ”function not supported” response to the application programme.

Note: On receipt of this command, the 4045 Model 20 emulation prints a hyphen.

Horizontal Tab (HT)

X'05'

Moves the print position to the right one tab stop setting which is set by the Set Horizontal Format command. If no tab stop is detected, or the last tab stop is to the *left* of the current print position, a movement to the right by one space is executed. If an HT is requested after passing the right margin, a new line is created, and a space is printed at the left margin.

Where:

05	The control sequence of the Horizontal Tab command

Indent Tab (IT) (twinax only)

X'39'

Moves the print position to the right by one tab stop and sets the effective left margin there. If no tab stop is detected, or the tab stop detected is to the *left*, an error type 2 occurs and a horizontal movement of a space width occurs.

Where:

39	The control sequence of the Indent Tab command

Index Return (IRT) (twinax only)

X'33'

Restores the indent position to the left margin and starts a new line.

Where:

33	The control sequence of the Index Return command

Inhibit Presentation (INP) (coax only)

X'24'

This command is used in conjunction with the Enable Presentation command. Printable characters between INP and ENP are translated to blanks. SCS control codes between INP and ENP can cause unpredictable results.

Note: The 4245 emulation carries out the actions described above. All other emulations ignore this command.

Where:

24	The control sequence of the Inhibit Presentation command

Interchange Record Separator (IRS)

X'1E'

Moves the print position to the first position on the next line. If the current position is at the end of a page, the print position is moved to the first line of the next page.

The print position is moved to the effective left margin of those printers which support the Set Horizontal Margin command (all coax emulations and twinax 3812 and 5219 emulations).

Where:

1E	The control sequence of the Interchange Record Separator command

Justify Text Field (JTF) (twinax only)

X'2BD2nn03rerepr'

Specifies the horizontal position of text to be justified. This command precedes the text to be justified, allows multi-column justification (command per column for each line), and allows justification of a single column when there are line numbers at the right edge. The text to be justified by this command is delimited by the command and the next occurrence of justify text field, carriage return, new line, required new line, interchange record separator, index return, form feed, or required form feed.

Where:

2B	The control sequence prefix of the Justify Text Field command
D2	The command class for the Justify Text Field command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'04' and X'05'; all other values cause an error type 3.
03	The control type for the Justify Text Field command
rere	A two-byte number specifying the horizontal position in 1/1440ths of an inch relative to the left margin to which the text will be justified. A value of 00H ends justification where the command is entered. Other valid values are: • less than or equal to the page width • not less than the effective left margin • not less than any previous JTF edge value on the same line. Invalid values cause an error type 4. If the number is not in exact 1/300th of an inch, it is rounded down to the nearest 1/300th.
pr	A one-byte number which specifies the percentage rule for justification as follows: X'00H =None X'01' - X'4B' = Half X'4C' - X'64' = Full (Default) All other values cause an error type 4, though values in brackets default as shown if processing is allowed to continue. **Note:** Half justification is not currently supported on the 3812 emulation; full justification is always used. The 3812 emulation reduces the white space between characters to less than a 'space' width unlike the 5219 emulation.

Notes: Tab controls are not field delimiters. The JTF command is not affected by line ending decisions.

If the text passes the right margin, the 3812 emulation justifies, but the 5219 emulation does not. Text that exceeds a justify right edge causes an error type 2.

Using this command causes an error type 2 if Set Justify Mode is active.

Line Feed (LF)

X'25'

Moves the print position to the same horizontal position on the next line. If the print position is the last line of the page, LF moves it to the first line of the next page.

Where:

25	The control sequence of the Line Feed command

Load Alternate Characters (LAC) (twinax only)

X'2BFEnnmmeei1----in'

Loads single-byte character images at specified EBCDIC addresses. Invalid parameters in any position of the command cause an invalid SCS parameter check.

Note: This command is ignored by the 5224 and 5225 emulations.

Where:

2B	The control sequence prefix of the Load Alternate Characters command
FE	The command class for the Load Alternate Characters command
nn	The number of bytes in the command string including the byte count itself. This value must not exceed X'FF'.
mm	A one-byte number which defines the character matrix size. The only supported value for this parameter is 01 which defines a matrix 8 high by 9 wide.
ee	A single-byte hexadecimal code which defines the code point to by which the load bit pattern will be referenced. Valid values for this parameter are X'01' -X'FF'.
i1----in	A field of byte values which define the character pattern in vertical slices of data. Each byte of 'i' defines one column of dots in the character (9 bytes per character). The least significant bit in each byte specifies the bottom dot in the column, and the first i byte specifies the left most column.

New Line (NL)

X'15'

Moves the print position to the first position on the next line. If the current position is at the end of a page, the print position is moved to the first line of the next page.

The print position is moved to the effective left margin of those printers which support the Set Horizontal Margin command (all coax emulations and twinax 3812 and 5219 emulations).

Where:

15	The control sequence of the New Line command

Null

X'00'

For the coax emulations, with the exception of the 4045 Model 20, a graphic error character is printed. The 4045 Model 20 emulation and all twinax emulations ignore nulls.

Note: The Set Graphic Error Action (SGEA) defines what actions are taken when a character in the data stream is not in the currently selected character set and cannot be printed (an unprintable graphic character).

If the SGEA function is not used, unprintable graphic characters are replaced with a hyphen (X'60') or, for the 4245 emulation, a space (X'40').

Where:

00	The control sequence of the Null command

Numeric Backspace (NBS) (twinax only)

X'36'

Same as backspace. Causes a left movement of the print position by a character width. If the space to the left margin is less than a character width, the print position becomes the left margin. If the left margin is released, the print position can backspace to the logical left edge. Any attempt to backspace beyond the logical left edge causes the print position to move to the left edge.

Where:

36	The control sequence of the Numeric Backspace command

Page Presentation Media (PPM) (coax only)

X'2BD2nn48xxxxxxsddoddxxxxxx'

Specifies the presentation media device settings of the printer. PPM specifies the source paper tray, the output tray offset, and the the output tray.

Where:

2B	The control sequence prefix of the Page Presentation Media command
D2	The command class for the Page Presentation Media command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'02' - X'0C'; others cause an error type 3.
48	The control type for the Page Presentation Media command
xxxxxx	A three-byte number which is not used.
sd	A one-byte number specifying the source paper tray that is used for paper or envelopes. Valid parameters are: X'00' = No change from current selection X'01' = Select paper tray 1 X'02' = Select paper tray 2 X'03 - X'FF' = No change from current selection. Attempts to feed from non-installed paper tray cause an error type 1.
do	A one-byte number which specifies that the output tray will be offset. Valid parameters are: X'00' = No offset Any other value causes the output tray to offset.
dd	A one-byte number specifying the output tray. As there is only one output tray, dd is also used to specify whether or not to offset the output tray. The output tray is offset if the parameter is changed from its value in the last PPM. **Note:** If two or more indications to offset the output tray are received, only the first is used.
xxxxxxxx	Four-byte number which is not used.

Note: This command must occur at page boundaries or an error type 2 is caused. If any of the above parameters are invalid, an error type 4 occurs.

Page Presentation Media (PPM) (twinax only)

X'2BD2nn48xxxxfcsddoddqqdx'

Specifies the presentation media device settings of the printer. PPM specifies the forms setting, the source paper tray, the output tray offset, the output tray, the print quality and the 2-sided function.

Where:

2B	The control sequence prefix of the Page Presentation Media command
D2	The command class for the Page Presentation Media command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'05' - X'0A'; others cause an error type 3.
48	The control type for the Page Presentation Media command
xxxx	A two-byte number which is not used.
fc	A one-byte number which selects forms type. Valid values for this parameter are below: X'00' = causes no change of paper tray. X'01' = paper selected. X'02' = envelopes (bypass tray) selected.
sd	A one-byte number specifying the source paper tray that is used for paper. This parameter is ignored if fc equals 2. Attempting to feed from non-installed paper tray causes an error type 1. All sd values greater than 00H are used as long as the specified tray is available in the printer. sd=X'00' causes no change.
do	A one-byte number which specifies the output tray offset of the 3812 or 5219 emulations. Valid values are X'00' -X' FF'. Any non-zero value causes the output tray to be jogged.

dd	A one-byte number specifying output tray. Valid parameters for the 5219 emulation are: X'00' = cause no change. X'01' = causes the output tray to be jogged. The 3812 emulation jogs its output tray if the parameter is not zero and has changed from its value in the last PPM.
qq	A one-byte number which specifies print quality. Valid values for this parameter are: X'00' = no change in quality. X'01' = sets the draft quality flag. X'02' = sets the standard quality flag. **Note:** These print quality settings are used internally by the printer, but they do not affect the quality of the printed output.
dx	A one-byte number which specifies the current 2-sided setting. X'00' = no change X'01' = 1-sided X'02' = book binding X'03' = pad binding.

Note: This command must occur at page boundaries or an error type 2 is caused. If any of the above parameters are invalid, an error type 4 occurs.

Relative Horizontal Presentation Position (RHPP) (twinax only)

X'34C8rh'

Moves the print position horizontally from its present position by the number specified by rh. The vertical position remains unchanged.

Where:

34	The control sequence prefix of the Relative Horizontal Presentation Position command
C8	The command class for the Relative Horizontal Presentation Position command
rh	The new horizontal print position. Valid values for rh are any positive number which does not cause the new position to be greater than maximum print position +1. If rh has a value of zero, command is ignored. Invalid values for rh cause an invalid SCS parameter check or an error type 4 on the twinax 3812 or 5219 emulations.

Relative Vertical Presentation Position (RVPP) (twinax only)

X'344Crv'

Moves the print position vertically from its present position by the number of lines specified by rv. The horizontal position remains unchanged.

Where:

34	The control sequence prefix of the Relative Vertical Presentation Position command
4C	The command class for the Relative Vertical Presentation Position command
rv	The new vertical print position Valid value for rv is any positive number which does not cause the new position to be greater than logical page length If rv has a value of zero, command is ignored. Invalid values for rv cause an invalid SCS parameter check, or an error type 4 on the twin-ax 3812 or 5219 emulations

Release Left Margin (RLM) (twinax only)

X'2BD2020B'

Specifies that a backspace or unit backspace can move the print position to the left of the left margin, but never beyond the logical left edge of the page. The RLM command is in effect until a carriage return, new line, required new line, interchange record separator, index return, form feed, or required form feed command is found. Then, the horizontal print position returns to the left margin or the current indent level and the RLM command is deactivated.

When RLM is followed by a new line code, it defines a paragraph boundary for the justification functions. This command is not used by the 3812 emulation except for reasons of justification (see Set Justification Mode command).

Where:

2B	The control sequence prefix of the Release Left Margin command
D2	The command class for the Release Left Margin command
02	The number of bytes in the command string including the byte count itself
0B	The control type for the Release Left Margin command

Repeat (RPT) (twinax only)

X'0A'

No operation performed and no character is printed.

Where:

0A	The control sequence of the Repeat command

Required Form Feed (RFF) (twinax only)

X'3A'

Restores indent to the left margin and moves the print position to the next logical page (line one). This command causes the 3812 and 5219 emulations to print the current page.

Where:

3A	The control sequence of the Required Form Feed command

Required New Line (RNL) (twinax only)

X'06'

Restores the indent position to left margin and starts a new line.

Where:

06	The control sequence of the Required New Line command

Required Space (RSP)

X'41'

In the twinax environment, this command causes the same displacement as a space. This character, however, is not recognised as an inter-word delimiter and cannot be increased/decreased for justification purposes.

In the coax environment, this character is treated as an normal printable character.

Where:

41	The control sequence of the Required Space command

Set Attribute (SA) (coax only)

X'28ttvv'

SA specifies an attribute that is to be associated with subsequent characters in the datastream. The codes remain valid until a new SNA chain begins or a new SA code changes the value of the character attribute.

Where:

28	The control sequence prefix of the Set Attribute command
tt	A one-byte number which defines the command as follows: X'00' = Reset X'41' = Extended highlighting X'42' = Colour X'43' = Character Set **Note:** Reset: Resets attributes to defaults
vv	A one-byte number which clarifies tt as follows: **Extended highlighting definitions:** X'00' = Normal (default) X'F1' = Blink (accept) X'F2' = Reverse video (accept) X'F4' = Underline **Note:** The receipt of Blink and Reverse Video parameters cause underlining to be disabled on all emulations other than the coax 3812 emulation. **Colour definitions:** X'00' = Black (default) X'F1' = Blue (prints black) X'F2' = Red (prints black) X'F3' = Pink (prints black) X'F4' = Green (prints black) X'F5' = Turquoise (prints black) X'F6' = Yellow (prints black) X'F7' = Black **Character set definitions:** X'00' = Default character set X'F1' = APL character set X'40'-X'FE' = Local character set identifier (ignored except for X'F1') For the 4045 Model 20, all codes are ignored other than X'00' which selects the Xerox printer's default font.

Note: Any invalid sequence is reported to the host as an invalid SCS command.

Set Character Density (SCD) (twinax only)

X'2BD2042900CP'

Defines the number of characters to be printed per horizontal inch (CPI).

Where:

2B	The control sequence prefix of the Set Character Density command
D2	The command class for the Set Character Density command
04	The number of bytes in the command string including the byte count itself
29	The control type for the Set Character Density command
00	A required parameter which must be 00
CP	A one-byte number which specifies a CPI value for the emulations as follows: X'00'= No change 3812, 5219, 5224, 5225 X'0A' = 10 3812, 4245, 5219, 5224, 5225, 6262 X'0B' = PS 3812, 5219 X'0C' = 12 3812, 5219 X'0F' = 15 3812, 5219, 5224, 5225 X'FF' = 10 3812, 5219, 5224, 5225 For 4245, 5224, 5225, and 6262 emulations, invalid parameters cause an invalid SCS parameter check and the CPI defaults to last selected CPI value. Out of range values for the 5219 and 3812 emulations cause an error type 4. **Note:** If the CPI value is changed it may cause an increase in the maximum print position. If this is the case, the maximum print position is increased to allow for the change in CPI. If CPI value does not cause the maximum print position to increase, then it stays as initially set by the set horizontal format.

Note: If this command is sent, but no SHF command is sent, the 3812 emulation's output will not match that produced by the IBM printer.

Set Coded Graphic Character Set Through Local ID (SCGL) (twinax only)

X'2BD10381id'

This command, which operates in ISO6937 mode only, selects one of 16 coded graphic character sets as the designated character set. Any character not defined in the selected character set prints as a not printable character (Set Graphic Error Action command).

Where:

2B	The control sequence prefix of the Set Coded Graphic Character Set Through Local ID command
D1	The command class for the Set Coded Graphic Character Set Through Local ID command
03	The number of bytes in the command string including the byte count itself
81	The control type for the Set Coded Graphic Character Set Through Local ID command
id	identification number of the requested character set: X'00' = Multinational X'01' = English (U.S.) X'02' = Austrian/German X'03' = Belgian X'04' = Brazilian X'05' = French Canadian X'06' = Danish/Norwegian X'07' = Finnish/Swedish X'08' = French X'09' = Italian X'0A' = Japanese - Latin characters X'0C' = Portuguese X'0D' = Spanish X'0E' = Spanish Speaking (Spanish) X'0F' = English (U.K.) X'65' = New Spanish word processing. (Spanish) X'FF' = Default value (set at the printer's user interface) All other values of id cause the default value to selected.

Note: The 3812 emulation output does *not* match the IBM printer output if this command is sent without an SHF command.

Refer to chapter 5, “Font and character sets,” under the heading “Character sets.” to see how this command relates to other language commands/features.

Code page definitions can be found in Appendix A.

Set Exception Action (SEA) (twinax only)

X'2BD2nn85ecac'

Specifies the action to take on detecting a text datastream exception condition (error type).

Where:

2B	The control sequence prefix of the Set Exception Action command
D2	The command class for the Set Exception Action command
nn	The number of bytes in the command string including the count byte itself. Valid numbers are X'04'-X'FF'. Any other number causes an error type 3 on the 5219 emulation, and error type 4 on the 3812 emulation.
85	The control type for the Set Exception Action command
ec	The first byte of up to 253 paired sets of one byte numbers (ecac) specifying exception condition action. The exception condition value which designates a group of exception conditions for which the specified action (defined by the ac byte) should to be taken. Valid values of ec are defined below: X'00' = Action should be taken for all exceptions in classes 1, 2, 3 and 4. X'01' = Detection of a condition that may cause loss of text information. X'02' = Condition detected that may alter the appearance of the printed output. X'03' = A multibyte command detected that contains an unsupported type or class code. X'04' = A multibyte command detected that contains an unsupported parameter or parameter value.

ac	The second byte of up to 253 paired sets of one-byte numbers (ecac) specifying exception condition action. The action to be taken by a process when the designated exception (defined by the previous ec byte) is detected. Valid values for ac are: X'00' = Accept: Indicate or present a message to the host that identifies the exception condition and proceed with the process. X'01' = Ignore: No action is required and no host exception indicator or message is required. X'02' = Cancel: The receiving process terminates with an indicator or message presented to the host that identifies the exception that caused the termination (default for the 3812 and 5219 emulations). X'03' = Intervention and response required: Send an indicator or message to the host that identifies the exception condition and requests an operator start or cancel response. If command processing is required to continue after an error, it starts processing the data immediately after the erroneous command unless otherwise stated in this chapter's command descriptions. If any parameter values are specified other those outlined above, an error type 4 will be posted. The command must occur at line boundaries; otherwise an error type 2 occurs.

Set FID Through GFID (SFG) (twinax only)

X'2BD10705gfgffwfwfa'

Selects font ID, font width, and font attributes.

Where:

2B	The control sequence prefix of the Set FID Through GFID command
D1	The command class for the Set FID Through GFID command
07	The number of bytes in the command string including the byte count itself
05	The control type for the Set FID Through GFID command
gfgf	A two-byte number specifying the GFID (font). Valid values are X'0000' - X'FFFF'.
fwfw	A two-byte number specifying the font width. The 3812 emulation accepts all values, but the 5219 emulation accepts the following values: X'54' = 17.1 CPI X'60' = 15 CPI X'78' = 12 CPI X'90' = 10 CPI X'A8' = 8.55 CPI X'0120' = 5 CPI all other values cause an error type 4. **Note:** IBM fonts allow the font widths to be set independently of the GFID, which defines typestyle and size. Xerox fonts, however, do not have this ability and the font width is determined by gfgf. The GFID font width values are given in chapter 5, “Font and character sets,” under “Character sets.” These values are therefore checked but ignored.
fa	A one-byte number specifying fixed pitch (fa=1) or P.S. (fa=2). Other values cause an error type 4.

Note: If the command does not change the current font, then it is ignored.

Set GCGID Through GCID (SCG) (twinax only)

X'2BD10601gcgccpcp'

This command operates in ISO6937 mode only, and selects the global character set ID (GCID) which is used to map subsequent text into printable graphics.

Where:

2B	The control sequence prefix of the Set Graphic Character Set Global ID (GCGID) Through Global Character Set ID (GCID) command
D1	The command class for the Set GCGID Through GCID command
06	The number of bytes in the command string including the byte count itself
01	The control type for the Set GCGID Through GCID command
gcgc	A two-byte number specifying the GCGID in the range of 0 - 65534. Invalid values cause an error type 4. This parameter is ignored.
Cpcp	A two-byte number, expressed in hexadecimal, specifying the code page global ID (CPGID) in the range of 1 - 65534 decimal. Valid values are: 037 = English (U.S.) 273 = Austrian/German 274 = Belgian 275 = Brazilian 276 = French Canadian 277 = Danish/Norwegian 278 = Finnish/Swedish 280 = Italian 281 = Japanese - Latin characters 282 = Portuguese 284 = Spanish/Spanish Speaking 285 = English (U.K.) 297 = French 500 = Multinational 892 = OCRA Invalid values causes code page 500 to be selected and an error type 4.

Note: This command is ignored if it does not change the current code page.

How this command relates to other language commands/features is shown on page 5-7.

Code page definitions can be found in Appendix A.

Set Graphic Error Action (SGEA) (coax only)

X'2BC803grop'

Defines the action to be taken when a character in the datastream is not in the currently selected character set and cannot be printed (an unprintable graphic character).

Note: This command is supported only by the 4245 emulation.

Where:

2B	The control sequence prefix of the Set Graphic Error Action command
C8	The command class for the Set Graphic Error Action command
03	The number of bytes in the command string including the byte count itself
gr	A one-byte number specifying the graphic to be substituted. If the code is not printable it is substituted by a space (X'40') and no error is reported.
op	A one-byte number specifying the unprintable character error option which can only be X'01' meaning no stop, no status. Any other value causes an invalid parameter error.

Note: If the SGEA function is not used, then unprintable graphic characters are replaced with a hyphen (X'60') or, for the 4245 emulation, a space (X'40'). An invalid SGEA setting does not change the current setting.

Set Graphic Error Action (SGEA) (twinax only)

X'2BC803nngguu'

Defines the action to be taken when a character in the data stream cannot be printed because it is not in the currently selected character set (an unprintable graphic character).

Where:

2B	The control sequence prefix of the Set Graphic Error Action command
C8	The command class for the Set Graphic Error Action command
nn	The number of bytes in the command including the byte count. Valid values are X'01', X'02' and X'03'. If nn equals X'01', default values for gg and uu apply. If nn equals X'02', gg defined and uu defined as default value. If nn equals X'03', gg and uu defined. Invalid nn parameter causes default values of gg and uu to be used and an invalid SCS parameter check or an error type 3 occurs.
gg	The hex value for default graphic. If gg is not specified or is not printable, the default value of a hyphen (X'60') is used or, for the 4245 emulation, a space (X'40') is used. No invalid check is issued.
uu	The not-printable character option, which decides the action taken by the printer when it is asked to print an unprintable character. The options available are: X'00' = Neither stop nor return status X'01' = Neither stop nor return status (default) X'02' = Neither stop nor return status X'03' = Stop and return status X'04' = Stop and return status. Invalid value of uu causes default value to be set and causes an invalid SCS parameter check or an error type 4.

Set Horizontal Format (SHF) (coax only)

X'2BC1nnhhlmrmt1....tn'

Defines the maximum number of characters per line, left margin, right margin, horizontal tabs, and activates the auto new line function.

Where:

2B	The control sequence prefix of the Set Horizontal Format command
C1	The command class for the Set Horizontal Format command
nn	The number of bytes in the command including nn. Valid values are X'01' to X'FF'. If nn equals X'01', the maximum print position defaults to the user selected value, the left margin defaults to column 1, the right margin defaults to mpp, and the tab values are cleared. These settings represent the printer's default state. A value of X'00' causes an SCS parameter check and default values to be installed.
hh	A one-byte number specifying the maximum horizontal print position in characters per line. Valid values for hh are printer dependent. The 3812 emulation accepts a maximum value of: X'8C' (140 decimal) - when the cpi is 10 X'A8' (168 decimal) - when the cpi is 12 X'D2' (210 decimal) - when the cpi is 15 X'DF' (223 decimal) - when the cpi is 17 The 3268 emulation accepts maximum values of X'84' (132) when 10 cpi is selected and X'DC' (220) when 17 cpi is selected. For all other emulations, the maximum value of hh is X'84' (132) as these emulations support only 10 cpi. A value of X'00' causes the default value to be used. If the hh value is not valid, defaults for this and all other parameters are selected and an SCS parameter check occurs. The default value for MPP (hh) is set at the printer.

lm	A one-byte number which specifies the column value of the left most print position. If lm is a positive number but less than the maximum print position (MPP), the value is adopted as the left margin setting. If lm is X'00' or nn is less than X'03', defaults are used for the left margin. If lm is greater than MPP, defaults are used for the left margin and horizontal tabs and an SCS parameter check occurs. Default = X'01'
rm	A one-byte number which specifies the column value of the right most print position. If rm is a positive number which is greater than or equal to lm, but less than the maximum print position (MPP), the value is accepted but not used. If rm is less than lm or greater than MPP, defaults are used for the right margin and horizontal tabs and an SCS parameter check occurs. Default = maximum print position.
t1....tn	A one-byte numbers that set the column number for horizontal tabs. Tab values are valid if they are less than the maximum print position (MPP) and greater than or equal to lm. If this is not the case no tabs are set and an SCS parameter check occurs. If a tab value is zero it is not set. The first tab value is lm and the default is a tab at each character space from the left margin.

Notes: This command must be initialised by a new line or a carriage return or the old values are used.

The maximum number of tabs is 251.

If the command is received on a page boundary, the page dimensions are recalculated, possibly changing the page orientation.

For further information on how the 4045 Model 20 emulation treats the SHF command, see Appendix D.

Set Horizontal Format (SHF) (twinax only)

X'2BC1nnhh'

Defines the maximum horizontal print position format and activates the auto new line function on the 3812 and 5219 emulations.

Where:

2B	The control sequence prefix of the Set Horizontal Format command
C1	The command class for the Set Horizontal Format command
nn	The number of bytes in the command string including the byte count itself. Valid values for nn are X'01' and X'02'. When nn equals X'01' or hh equals X'00', hh defaults to maximum print position for the present character pitch. Any invalid value of nn also causes the system defaults to be used (these are given below). **Note:** The 3812 emulation defaults the right margin to 13.2 inches if nn=X'01', if hh=X'00', or if hh is omitted. If nn equals X'02', the page width is defined by hh.
hh	A one-byte number specifying the maximum horizontal print position in character widths. If the new maximum print position is greater than the current maximum print position, an automatic new line occurs. Proportional space fonts are assumed to have a pitch of 12 cpi. The 3812 emulation accepts all values of hh. For the 5219 emulation, valid values for hh are from X'00' to the maximum shown below: X'84' (132 decimal) at 10 cpi X'98' (158 decimal) at 12 cpi and PS X'C6' (198 decimal) at 15cpi These maximum values represent the defaults for each pitch setting.

Notes: Default hh CPI parameters are used if invalid nn or hh parameters are specified.

Invalid nn causes invalid SCS parameter check or an error type 4.

If hh is less than the left margin, or greater than the right physical limit, either an SCS parameter check or an error type 4 occurs.

A CPI change may alter the right margin.

If the command is received at a page boundary, the page dimensions are recalculated, possibly changing the page orientation.

Set Horizontal Margins (SHM) (twinax only)

X'2BD2nn11lmlmrmrm'

Specifies left and right margins in 1/1440th of an inch relative to the left edge of the page.

Where:

2B	The control sequence prefix of the Set Horizontal Margins command
D2	The command class for the Set Horizontal Margins command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'04' and X'06'; all other values cause an error type 3.
11	The control type for the Set Horizontal Margins command
lmlm	A two-byte number specifying in 1/1440th of an inch the left margin relative to the page's left edge. Valid values for lmlm are 0-32767 decimal for the 3812 emulation and 0-19008 decimal for the 5219 emulation; other values cause an error type 4. If lmlm equals 0, the horizontal margin settings remain unchanged. If lmlm equals 1, the left margin is set to 0 inches. Values not evenly divisible by 1/300th of an inch are rounded down to the nearest 1/300th. **Note:** The default for lmlm in wordprocessing mode is 2160, and 1 in dataprocessing mode.

rmrm	A two-byte number specifying in 1/1440th of an inch the right margin relative to the page's left edge. Valid values are 0-32767 decimal for the 3812 emulation, and 0-19008 decimal for the 5219 emulation; other values cause an error type 4. If rmrm equals 0 (from the left edge), horizontal margin settings remain unchanged. If rmrm equals 1, the right margin is set to 0 inches. Values not evenly divisible by 1/300th of an inch are rounded down to the nearest 1/300th. Support for the right margin parameter is required only for Set Justify Mode (SJM). The right margin is ignored, unless SJM is active. If SJM is active and the right margin setting is greater than the page width or the maximum print position, or if the left margin is greater than the right margin, an error type 2 occurs. **Notes:** The default for rmrm in wordprocessing mode is 10800, and in dataprocessing mode is 19008. rmrm must be large enough to allow printing. This is also dependent on the font size.

Note: The command is valid only at line boundaries; if it occurs anywhere else an error type 2 occurs.

Set Horizontal Tab (STAB) (twinax only)

X'2BD2nn01ffaltabs'

Specifies the horizontal tab settings and the alignment characteristics associated with each tab position. Tab stops specified by this command always replace the current tab settings.

Where:

2B	The control sequence prefix of the Set Horizontal Tab command
D2	The command class for the Set Horizontal Tab command
nn	The number of bytes in the command string including the byte count itself. Valid values are, expressed in decimal, 3 and increments of 3 up to 255. If nn equals X'03', only ff is specified. This particular format causes all tabs to be reset. If nn is less than X'03', an error type 3 occurs. If processing continues, the command is ignored.
01	The control type for the Set Horizontal Tab command
ff	The tab stop value, which is either floating or fixed. If ff equals X'00', the tab stop value is defined in character widths from the left margin (floating). If ff equals X'01', tab stop value is given in 1/1440th of an inch from the left margin (fixed). Any other values of ff cause an error type 4.
al	A one-byte number specifying the type of alignment to be performed in positioning the text at the designated tab stop. This must always be X'00' for normal alignment and be associated with two further bytes, which actually define the tabs; otherwise an error type 4 occurs.
tabs	A two-byte number specifying the horizontal location of the tab stop. The method of calculating the tab position is dependent on the value of ff. Valid values for tabs are 0-32767 decimal; other values cause an error type 4. Tabs must be associated with an al byte and may be in any order. tabs = X'00' no tabs set. tabs = X'01' tab stop set at left margin Other values are rounded down to the nearest 1/30th of an inch if they are not multiples of 1/30th of an inch.

Note: This command is valid only at line boundaries. Failure to follow this restriction causes an error type 2.

Set Indent Level (SIL) (twinax only)

X'2BD20307il'

Specifies the indent tab level to be applied to the text without requiring tab stops. The indent tab supplied by this function is processed as if the indent level was set by a horizontal tab.

Where:

2B	The control sequence prefix of the Set Indent Level command
D2	The command class for the Set Indent Level command
03	The number of bytes in the command string including the byte count itself
07	The control type for the Set Indent Level command
il	A one-byte number specifying the indent tab level in number of tabs from left margin. Valid values X'00' - X'54'. A value greater than X'54' causes an error type 2.

Note: This command is valid only at line boundaries. Failure to follow this restriction causes an error type 2.

Set Initial Conditions (SIC) (twinax only)

X'2BD20345si'

Sets and resets internal formatting parameters to their initialisation values and indicates the end of a document.

Where:

2B	The control sequence prefix of the Set Initial Conditions command
D2	The command class for the Set Initial Conditions command
03	The number of bytes in the command string including the byte count itself
45	The control type for the Set Initial Conditions command
si	A one-byte number designating a set of initial conditions. The valid conditions are: X'01' = Word processing environment (US) X'02' = Word processing environment (Non-US) X'FF' = Data processing environment (default). Any other values for si are invalid and cause an error type 4. When the SIC occurs requesting, dataprocessing mode, the output tray is jogged (offset).

The following parameters are set by the SIC command:

Parameter/condition	**D/P mode**	**W/P mode**
Page width	n/a	216 mm
Left margin	0.0 inches	1.5 inches
Right margin	13.2 inches	7.5 inches
Top margin	432 mm	1.17 inches
Release left margin	no	no
First writing line	1	7
Font (GFID)	11	85
Auto new line	active	inactive
Auto new page	active	inactive

Parameter/condition	D/P mode	W/P mode
Page length	n/a	279 mm
Lines per inch	6	6
Line spacing	single	single
Maximum print lines	5219 = 1 3812 = 66	n/a
Maximum print position	132	n/a
Pitch (CPI)	10	12
Tab stops	cleared	cleared
Indent level	left margin	left margin
Character set ID	UI selected	CP 500
Font attribute	fixed pitch	fixed pitch
Forms control type	paper	paper
Source paper tray	bottom	bottom
Output tray	1	1
Ribbon saver mode (print quality)	draft	draft
Justification	inactive	inactive
Justification % rule	100%	100%
Continuous underscore	inactive	inactive
Continuous overstrike	inactive	inactive
Bolding	inactive	inactive
Unprintable character option	no stop	terminate
Substitute character	hyphen	hyphen
Exception action	terminate	terminate
Feed type	cut sheet	cut sheet

Set Justify Mode (SJM) (twinax only)

X'2BD2nn0Dstpr'

Specifies justification of the following lines of text. SJM produces right-aligned text. Once an SJM command is active, it remains in effect until deactivated by another command. The text is justified to the right margin as specified by a previous Set Horizontal Margin (SHM) command. When this command is active, the last line of a paragraph is not justified. Paragraph delimiters are:

- two or more new lines or interchange record separator
- required new line
- new line, line feed
- new line, horizontal tab
- new line, indent tab
- new line, space
- new line, numeric space
- new line, required space
- new line, backspace
- required, form feed
- index return
- new line, carriage return
- new line, release left margin
- new line, numeric backspace.

These must be consecutive with *no* single-byte command codes between them. All such multi- and single-byte codes are ignored when computing paragraph boundaries.

Where:

2B	The control sequence prefix of the Set Justify Mode command
D2	The command class for the Set Justify Mode command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'03' and X'04'; all others cause an error type 3.
0D	The control type for the Set Justify Mode command
st	Specifies the state of justification: X'01' = justification is active X'00' = justification is inactive. All other values cause an error type 4.
pr	A one-byte number which specifies the percent of justification as follows: X'00' = None X'01'-X'4B' = Half X'4C'-X'64' = Full (default) Other values cause an error type 4, though values in brackets default as shown if processing is allowed to continue.

Notes: Half justification is not currently supported in the 3812 emulation.

Text beyond the right margin is not justified by the 5219 emulation and causes an error type 2. The 3812 emulation, however, reduces the white space between characters to less than a “space” width in order to achieve justification.

This command is not allowed when JTF is active, and must occur at line boundaries; if either of these conditions are not met, an error type 2 will occur.

Unexpected results may occur if this command is used without having previously set the horizontal margins.

Set Line Density (SLD) (coax only)

X'2BC6nnld'

Defines the vertical space required for one print line (Lines Per Inch-LPI), overriding those set at the control panel.

Where:

2B	The control sequence prefix of the Set Line Density command
C6	The command class for the Set Line Density command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'01' and X'02'. If nn equals X'01', ld defaults to the value set at the printer, except for the 3287 emulation, which defaults to 6 LPI. If nn equals X'02', the ld parameter is used.
ld	The line density or the distance moved for a single line of vertical spacing. The valid values for this parameter for each emulation and the correlation between LPI and the ld value are: X'00' = 6 3262, 3268, 3287, 3812,4245, 6262, 4045 Model 20 X'09' = 8 3262, 3268, 3287, 3812,4245, 6262 X'0C' = 6 3262, 3268, 3287, 3812,4245, 6262, 4045 Model 20 X'12' = 4 3262, 3268, 3287, 3812, 6262, 4045 Model 20 X'18' = 3 3262, 3268, 3287, 3812, 6262, 4045 Model 20

An invalid value for nn or ld causes all emulations to use a default of 6 LPI and an invalid SCS parameter check to occur. The exceptions to this are the 3262, 4245 and 6262 emulations, which use the previously defined LPI value.

Set Line Density (SLD) (twinax only)

X'2BC6nnld'

Defines the vertical space required for one print line (Lines Per Inch or LPI) overriding those set at the control panel.

Where:

2B	The control sequence prefix of the Set Line Density command
C6	The command class for the Set Line Density command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'01' and X'02'. If nn equals X'01' or ld equals X'00', all emulations use a line density of 6 LPI, except for the 4245 and the 6262 emulations, which use the value set at the printer's control panel. If nn equals X'02', the ld parameter is used.
ld	The line density or the distance moved for a single line of vertical spacing. The valid values for this parameter for each emulation and the correlation between LPI and the ld value are: X'00' = Def 3812, 4245, 5219, 5262, 6262 X'06' = 12 3812, 5219 X'08' = 9.6 3812, 5219 X'09' = 8 3812, 4245, 5219, 5262, 6262 X'0C' = 6 3812, 4245, 5219, 5262, 6262 X'0D' = 5.33 3812, 5219 X'12' = 4 3812, 5219, 6262 X'18' = 3 6262 **Notes:** For line spacing of 9.6 and 5.33 lpi, the Xerox printer provides a "best fit" due to differing technologies. The same applies for the IBM 3812 printer. The 5224/5225 emulations accept any values of ld

An invalid value for nn causes the LPI to remain unchanged for all emulations, except the 3812 and 5262 emulations, which default to 6 lpi.

Invalid values of ld cause no change to the 4245, 6262 and 5262 emulations. Invalid values for the 3812 and 5219 emulations are rounded up to the next accepted ld value until ld is greater than X'12'; then lpi is set to 6.

An invalid SCS parameter check or an error type 3 occurs for any of the above errors.

Set Line Spacing (SLS) (twinax only)

X'2BD20309ls'

Specifies multiple line spacing, in half lines, to be moved when encountering: a new line, required new line, line feed, or an interchange record separator.

Where:

2B	The control sequence prefix of the Set Line Spacing command
D2	The command class for the Set Line Spacing command
03	The number of bytes in the command string including the byte count itself
09	The control type for the Set Line Spacing command
ls	A one-byte number specifying the multiple line spacing in half lines. Valid values for the 5219 emulation are X'02', X'03', X'04', and X'06'(default = X'02'). All other values cause an error type 4. The 3812 emulation accepts all values of ls.

Note: This command is valid only at line boundaries. Failure to follow this restriction causes an error type 2.

Set Presentation Page Size (SPPS) (twinax only)

X'2BD2nn40wdwddpdp'

Specifies the width and depth of the physical page in the printer. This command deactivates auto new line and auto page end; so, if text is placed beyond the right extent of the page, an error type 1 occurs.

Where:

2B	The control sequence prefix of the Set Presentation Page Size command
D2	The command class for the Set Presentation Page Size command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'04' and X'06'; all other values cause an error type 3.
40	The control type for the Set Presentation Page Size command
wdwd	A two-byte number specifying width of the page in 1/1440th of an inch. Valid values are 0-19008 decimal for the 5219 emulation and 0-32767 decimal for the 3812 emulation. If wdwd equals X'00' the width of the page remains unchanged.
dpdp	A two-byte number specifying the depth of the page in 1/1440th of an inch. Valid values are 0-32767 decimal. If dpdp is omitted or equals X'00', the depth of the page remains unchanged.

Note: Out of range values for either wdwd or dpdp produce an error type 4. This command must occur at page boundaries; otherwise, an error type 2 occurs.

Set Print Density (SPD) (coax only)

X'2BD2nn2900cp'

Defines the number of characters to be printed per horizontal inch (CPI).

Where:

2B	The control sequence prefix of the Set Print Density command
D2	The command class for the Set Print Density command
nn	The number of bytes in the command string including the byte count itself. The valid conditions are: X'02'= the default value for CPI applies X'04'= CPI is defined by cp. Any other values cause the default value of CPI, which is set at the printer, to be used and an invalid SCS parameter check.
29	The control type for the Set Print Density command
00	A one-byte number which must be X'00'
cp	A one-byte number which specifies a CPI value for the emulations as follows: X'00' = Def 3812, 3268, 6262 X'0A' = 10 CPI 3812, 3268, 6262 X'0C' = 12 CPI 3812 X'0F' = 15 CPI 3812 X'10' = 17 CPI 3812, 3268 An invalid cp parameter causes the CPI default to be set at the printer, and an invalid SCS parameter check. Changing the CPI value may increase the maximum print position. If a CPI change does not increase the maximum print position, it stays as originally set by Set Horizontal Format. **Note:** Font Titan 17M is equal to 16.67 characters per inch. The value of 16.67 is used when calculating orientation.

Set Printer Set up (SPSU) (twinax only)

X'2BD2nn4Cxxpfxxsi'

Specifies the paper feed unit and the printer set up to be used. It does not affect the current source paper tray settings.

Where:

2B	The control sequence prefix of the Set Printer Set up command
D2	The command class for the Set Printer Setu p command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'04' - X'41'; all other values cause an error type 3.
xx	A one-byte number which is reserved for future use and must be set to X'00'.
pf	A one-byte number specifying the feed unit to be used. The following values are valid: X'00' = no change (supported) X'01' = select manual feed (supported) X'02' = select form feed (ignored) X'03' = select auto-cut sheet feed (supported) Any other values cause an error type 4.
xx	A one-byte number which is reserved for future use and must be set to X'00'.
si	A string of EBCDIC values up to 60 bytes in length, which is ignored.

Note: This command is only valid at page boundaries. Failure to follow this restriction causes an error type 2.

Set Single Line Distance (SSLD) (twinax only)

X'2BD20415ldld'.

Specifies the vertical distance moved for a single line space. This control, combined with the Set Line Spacing (SLS) control, specifies the distance moved for the vertical space controls.

Where:

2B	The control sequence prefix of the Set Single Line Distance command
D2	The command class for the Set Single Line Distance command
04	The number of bytes in the command string including the byte count itself
15	The control type for the Set Single Line Distance command
ldld	A two-byte number specifying the line depth in 1/1440th of an inch. The default value is X'00F0' (6 LPI). Values supported by the 5219 emulation are: X'001E' = 48 LPI X'003C' = 24 LPI X'0078' = 12 LPI X'0096' = 9.6 LPI X'00B4' = 8 LPI X'00F0' = 6 LPI X'010E' = 5.3 LPI X'0168' = 4 LPI X'023A' = 1 line per cm. The 3812 emulation supports ldld values ranging from 1 to 2767. Unsupported values for ldld give an error type 4.

Note: The command is valid only at line boundaries; otherwise an error type 2 occurs.

Set Text Orientation (STO) (coax only)

X'2BD10683xx002D00'

Sets the in line direction of characters on a page.

Note: This command is used on dot-matrix printers to improve print alignment and is provided for compatibility. It has no effect on a laser printer.

Where:

2B	The control sequence prefix of the Set Text Orientation command
D1	The command class for the Set Text Orientation command
06	The number of bytes in the command string including the byte count itself. The only valid value is X'06'; all other values cause an error type 4.
83	The control type for the Set Text Orientation command
xx	A one-byte number which specifies the in line direction. Valid values are: X'00' = Left to right X'5A' = Right to left All other values are invalid and result in an invalid SCS parameter check.
00	A required parameter which must be X'00'
2D	A required parameter which must be X'2D'
00	A required parameter which must be X'00'

Notes: The STO command is valid only at a line boundary; that is, immediately following an Inter-Record Separator (IRS), New Line (NL), Line Feed (LF), Form Feed (FF), Vertical Tab (VT) or Vertical Channel Select (VCS). If the STO is received at any other time, an invalid SCS parameter check results.

Set Text Orientation (STO) (twinax only)

X'2BD3nnF6cacalala'

Rotates the page. This command is supported on the 3812 and 5219 emulations.

Where:

2B	The control sequence prefix of the Set Text Orientation command
D3	The command class for the Set Text Orientation command
nn	The number of bytes in the command string including the byte count itself. The only valid value is X'06'; all other values cause an error type 4.
F6	The control type for the Set Text Orientation command
caca	A two-byte number which specifies clockwise character rotation. XCTO does not support this option.
lala	A two-byte number specifying the clockwise rotation in 1/128 increments of a degree from the base line. Valid values of lala are: X'0000' = Portrait X'2D00'= Landscape X'5A00' = Portrait X'8700' = Landscape X'FFFE' = Select computer output reduction (COR) X'FFFF' = Default (orientation based on SPPS command). Other values cause an error type 4 to occur.

Set Vertical Format (SVF) (coax only)

X'2BC2nnvvtmbmt1...tn'

Specifies the maximum number of lines per page, top margin, bottom margin, and vertical tabs. The first 12 tabs specify the Vertical Channel Select stops. On processing this command, the current line becomes logical line one, except on the 3812 emulation where it causes a form feed.

Where:

2B	The control sequence prefix of the Set Vertical Format command
C2	The command class for the Set Vertical Format command
nn	The number of bytes in the command string including the byte count itself. The valid values are X'01' - X'FF'. If nn equals 01, the defaults used are the page length and bottom margin set at the printer, 1 for top margin, and no tabs set. A value of X'00'causes an SCS parameter check and default values to be used
vv	A one-byte number which specifies the maximum number of lines per page (MPL). Valid maximum values for vv, shown in decimal, are emulation dependent as follows: 3262 = 127 (X'7F') 3268 = 127 (X'7F') 3287 = 102 (X'66') 3812 = 42 (X'2A')@3lpi, 56 (X'38')@4lpi, 84 (X'54')@6lpi, 112 (X'70')@8lpi 4245 = 127 (X'7F') 6262 = 127 (X'7F') 4045 Model 20 = 102 (X'66') A value of X'00' causes the default values set at the printer to be used. If the vv value is not in range, an SCS parameter check results and default value set at the printer is used

tm	A one-byte number which specifies the first print line of the page If tm is a positive number, but less than or equal to the maximum page length (MPL), the value is adopted as the top margin setting. If tm is X'00' or nn is less than 3, defaults are used for the top margin. If tm is greater than MPL, defaults are used for the top margin, bottom margin, and vertical tabs, and an SCS parameter check results. Default = 1
bm	A one-byte number which specifies the last print line of the page. If bm is a positive number that is greater than or equal to tm, but less than or equal to the maximum page length (MPL), the value is adopted as the bottom margin. If bm is X'00' or nn is less than 4, the bottom margin defaults to MPL. If bm is less than tm or greater than MPL, defaults are used for the bottom margin, and vertical tabs, and an SCS parameter check results. Default = maximum lines per page.
t1...tn	These one-byte values set line number values for both Vertical Tabs (VT) and Vertical Channel Select (VCS) functions. Tab values are valid if they are less than bm and greater than or equal to tm; if this is not the case, an SCS parameter check occurs. If an error is found, tab processing stops and the tab values last set remain unchanged. If a tab value is zero, it sets no tab or channel value. tm is always the first tab value. Default = each line from the top margin.

Notes: If this command is received at a page boundary, the page dimensions are recalculated, possibly changing the page orientation.

The maximum number of tabs that can be set is 251.

For further information on how the 4045 Model 20 treats the SVF command, refer to Appendix D.

Set Vertical Format (SVF) (twinax only)

X'2BC2nnvv'

Specifies the maximum number of lines per page and starts the auto page end function on the 5219 and 3812 emulations. On processing this command, the current line becomes logical line one except on the 3812 emulation, where it causes a form feed.

Where:

2B	The control sequence prefix of the Justify Text Field command
C2	The command class for the Justify Text Field command
nn	The number of bytes in the command string including the byte count itself. The only valid values are X'02' and X'01'. If nn equals X'01', vv defaults to the appropriate value for the selected printer. These values are 66 lines for the 3812, 1 line for the 5219, and the value set at the printer for all other emulations. If nn equals X'02', the vv parameter is used. If nn is invalid, the default of the maximum lines per page is used.
vv	The maximum number of lines per page. Valid values for vv are X'00' - X'FF'. A value of 00 causes a default value to be used. Default value for vv are 66 lines for the 3812, one line for the 5219, and the value set at the printer for all other emulations.

Note: If this command is received at a page boundary, the dimensions are recalculated, possibly changing the page orientation.

Set Vertical Margins (SVM) (twinax only)

X'2BD2nn49tmtmbmbm'

Specifies top and bottom margins.

Where:

2B	The control sequence prefix of the Set Vertical Margins command
D2	The command class for the Set Vertical Margins command
nn	The number of bytes in the command string including the byte count itself. Valid values are X'04' - X'06'; all other values cause an error type 3.
49	The control type for the Set Vertical Margins command
tmtm	A two-byte number which specifies, in 1/1440 of an inch, the distance from the top edge to the baseline of the first print line on the page. Valid values for tmtm are 0-32767 decimal; any others cause an error type 4. If any attempt is made to print text above the top margin, an error type 1 occurs, e.g., for a tmtm between 1-239 for 6 LPI. This error type is posted before printing the first character. If tmtm equals X'00', the top margin remains unchanged. If tmtm is not a multiple of 1/300th, then it is rounded down to the nearest 1/300th. For a tmtm greater than the page depth, it defaults to the page depth and causes an error type 1. The default is X'00', but can be set to a different value at the printer.

bmbm	A two-byte number which specifies, in 1/1440th of an inch, the bottom of the last print line relative to the top edge. Support for this parameter is not required and thus it is not used on 5219 emulation and is optional on 3812 emulation.

Note: This command must occur on the page boundaries; otherwise an error type 2 occurs.

Space (SP)

X'40'

Causes the print position to move one character width right. This width may be increased for justification on the 5219 emulation, and increased/decreased for justification on the 3812 emulation.

Where:

40	The control sequence of the Space command

Subscript (SBS) (twinax only)

X'38'

Causes downward displacement of half a line. The number of half line displacements up and down are tracked, with an equal number of each causing a return to the baseline. If not equal at the end of a line, a hanging half index condition occurs. Since index conditions are related to current vertical position, all following lines are offset until displacement counts become equal. The 3812 emulation accepts any number of SBSs, while the 5219 emulation support only one level of subscription.

Where:

38	The control sequence of the Subscript command

Substitute (SUB) (twinax only)

X'3F'

The substitute character (hyphen) is printed.

Where:

3F	The control sequence of the Substitute command

Superscript (SPS) (twinax only)

X'09'

Causes upward displacement of half a line. The number of half line displacements up and down are tracked, with an equal number of each causing a return to the baseline. If not equal at the end of a line, a hanging half index condition occurs. Since index conditions are related to current vertical position all following lines are offset until displacement counts become equal. 3812 emulation accepts multiple of SPSs, while the 5219 emulation supports only one level of superscript.

Where:

09	The control sequence of the Superscript command

Switch (SW) (twinax only)

X'2A'

No-op occurs and no character is printed.

Where:

2A	The control sequence of the Switch command

Transparent (TRN)

X'35nn'

This command indicates the start of a transparent datastream. Data within a transparent stream is defined by the user; therefore, the printer does not scan the SCS data for control codes. A hyphen is substituted, however, for all codes below X'40'.

Where:

35	The control sequence prefix of the Transparent command
nn	The number of bytes following this command *not* to be checked for printed datastream commands.

Underscore (US)

X'6D'

Prints the underscore character.

Where:

6D	The control sequence of the Underscore command

Unit Backspace (UBS) (twinax only)

X'1A'

In proportional space mode, this command causes a back space one escape unit in width (always a 1/60th of an inch). In normal mode, a no-op occurs.

Where:

1A	The control sequence of the Unit Backspace command

Vertical Channel Select (VCS) (coax only)

X'04vv'

Allows the movement of the paper to a specific line number. This is achieved by using the top margin and the first 11 tab settings from the Set Vertical Format command to specify 12 vertical channels. The first channel is always the top margin, even if no tabs have been set.

Where:

04	The control sequence prefix of the Vertical Channel Select command
vv	The byte that selects the channel to skip to. The correlations between valid values and the channel selection are: X'7A' = 10 X'7B' = 11 X'7C' = 12 X'81' = 1 X'82' = 2 X'83' = 3 X'84' = 4 X'85' = 5 X'86' = 6 X'87' = 7 X'88' = 8 X'89' = 9

Note: For the 3287 and 4045 Model 20 emulations, this command is not supported and causes a line feed.

All values, except channel one, must be specified before use; otherwise, the VCS command is treated as a Line feed. If the channel selected is less than or equal to the current page position, the print position moves to the correct line on the next page.

Vertical Tab (VT) (coax only)

X'0B'

Moves the print position vertically down to the next tab stop setting, which is set by the Set Vertical Format command. If no vertical tab stops are below the current print position, a vertical tab results in a line feed. If a vertical tab is requested with the print position below the bottom margin, it results in a move to the top margin of the next page.

Where:

0B	The control sequence of the Vertical Tab command

Word Underscore (WUS) (twinax only)

X'23'

Causes the preceding complete word/words to be underscored back to the word begin delimiter.

Where:

23	The control sequence of the Word Underscore command

Word delimiters are:

- Backspace
- New line
- Horizontal tab
- Line feed
- Indent tab
- Justify text field
- Form feed
- Required new line
- Required form feed
- Space
- Numeric space
- Unit backspace
- Word underscore
- Carriage return
- Interchange record separator
- All four presentation position commands
- Underscore graphic.

The 5219 emulation underscores at baseline level only, while the 3812 emulation underscores at super and subscript levels.

Xerox Transparent (TRN) (coax only)

X'36nn'

This command indicates the start of a transparent datastream. Data within a transparent stream is defined by the user; therefore, the printer does not scan the SCS data for control codes. A hyphen is substituted, however, for all codes below X'40'. Unlike the IBM Transparent mode X'35', codes below X'40' are not substituted with a hyphen.

Where:

36	The control sequence prefix of the Transparent command
nn	The number of bytes following this command *not* to be checked for printed datastream commands.

3. Special features

This chapter describes those features of the Xerox Coax/Twinax Option (XCTO) which are either not available on the emulated IBM printers or are available in a different form. These are the value-added features which provide you with benefits over a plug compatible emulation of an IBM printer. Many of these features already exist on protocol converters sold by Xerox. When possible, access to these features within the XCTO design is compatible with existing protocol converters. The features described in this chapter allow the printer to support the following Xerox-supplied host software packages:

- XDGI/XPPI
- RPMF
- XPAF
- XICS.

The additional features of XCTO are discussed in this chapter.

The method by which the Xerox Coax/Twinax Option passes commands and data to the printer is controlled at the printer's control panel. This is used to set the following:

- Translation modes (see below)
- Special features operation (page 3-8).

Modes of translation

There are three modes of translation: ISO6937, EBCDIC-SNA, and EBCDIC-DSC. These modes are provided to give you maximum flexibility as well as backward compatibility with previous Xerox products. The translation modes are selected at the printer's control panel. The method of selection for these modes is fully described in your *Xerox 4213 Laser Printer User Guide*.

Using these modes, XCTO translates as follows:

- ISO6937—All data is translated by XCTO as shown in the tables in Appendix A.
- EBCDIC (SNA)—Data is passed to the printer without translation.
- EBCDIC (DSC)—Characters X'08' to X'BF' are remapped to X'40' to X'FF', as shown in the EBCDIC—DSC translate table in Appendix A. This is carried out to create the DSC input required by the printer.

Figures 3-1 to 3-6 show the translation processes according to the mode, ISO6937 or EBCDIC-SNA or EBCDIC-DSC, set at the printer's control panel.

Notes:

1. The IBM EBCDIC-DSC code pages supported in the ISO6937 mode and the EBCDIC-DSC mode are given in Appendix A. The EBCDIC-SNA character mappings for APL and OCR are also given in Appendix A. Other EBCDIC-SNA tables can be found in the printer documentation.
2. The special features which allow translate table customisation and user string definition are not available when the printer has been set for EBCDIC-SNA or EBCDIC-DSC. All the other special features described later in this chapter function in whichever translation mode the XCTO is operating.

ISO6937 mode

Figure 3-1. **Translation process for the coax LU1 environment**

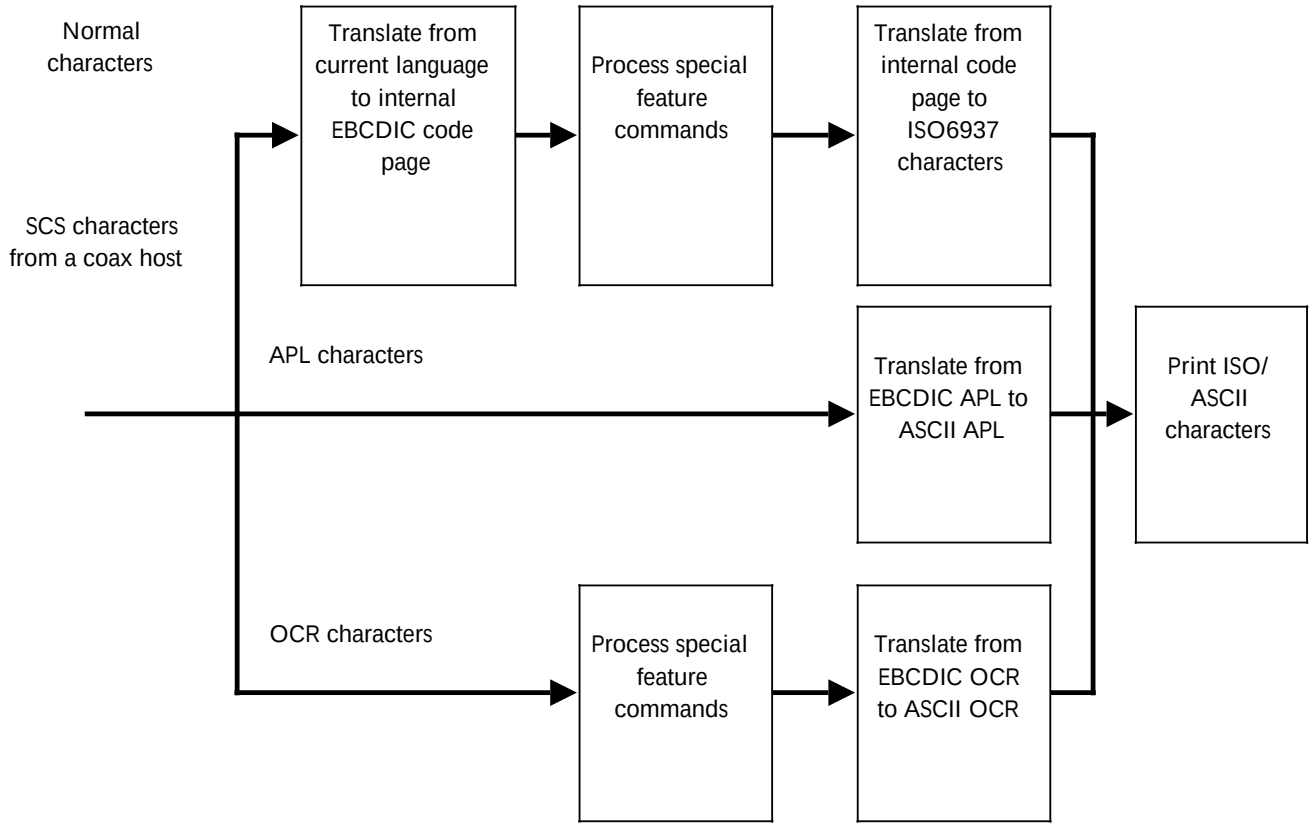


Figure 3-2. **Translation process for the coax LU3 environment**

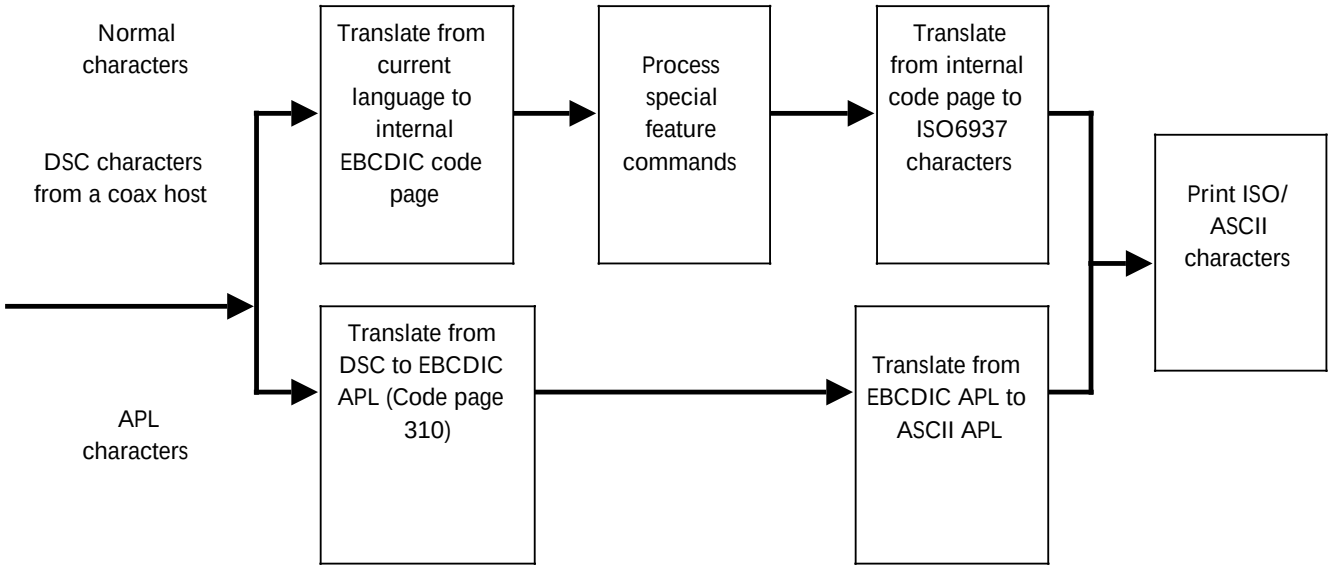
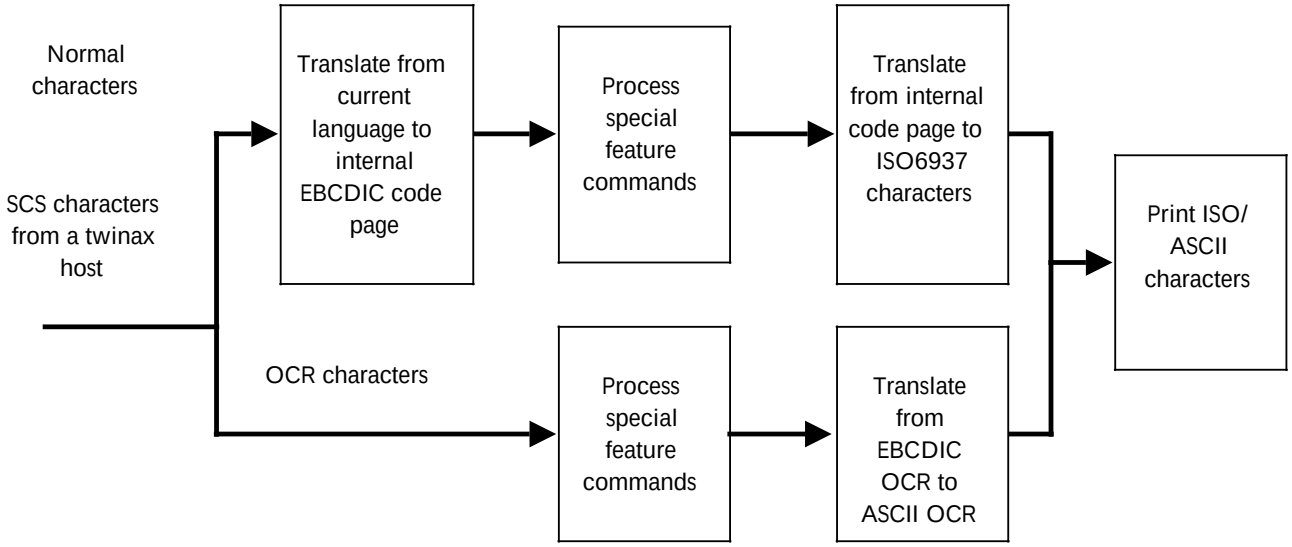


Figure 3-3. **Translation process for the twinax environment**



EBCDIC-SNA mode

Figure 3-4. **Translation process for the coax environment**

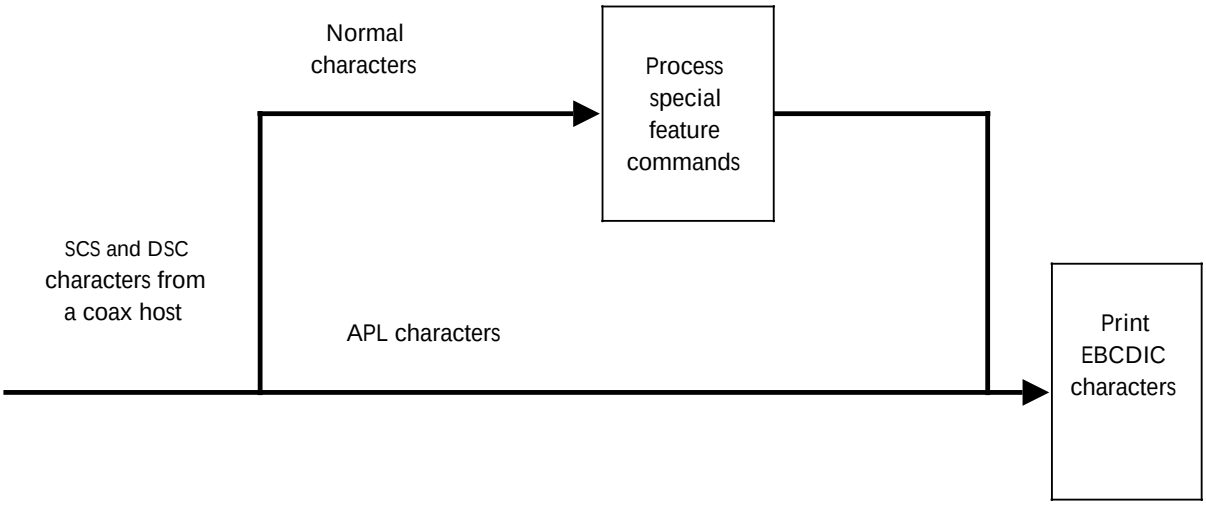
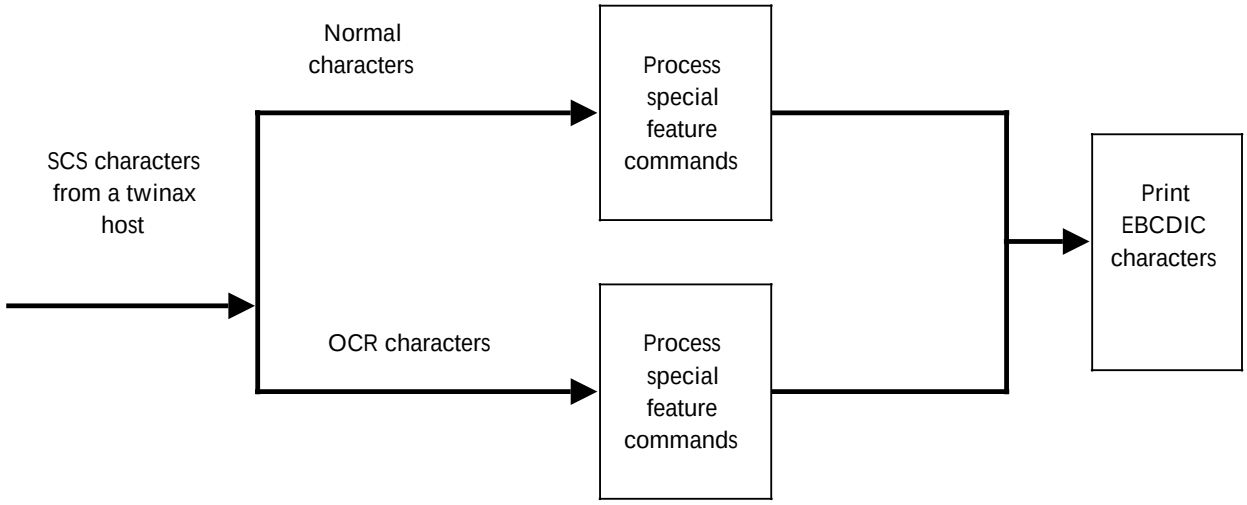
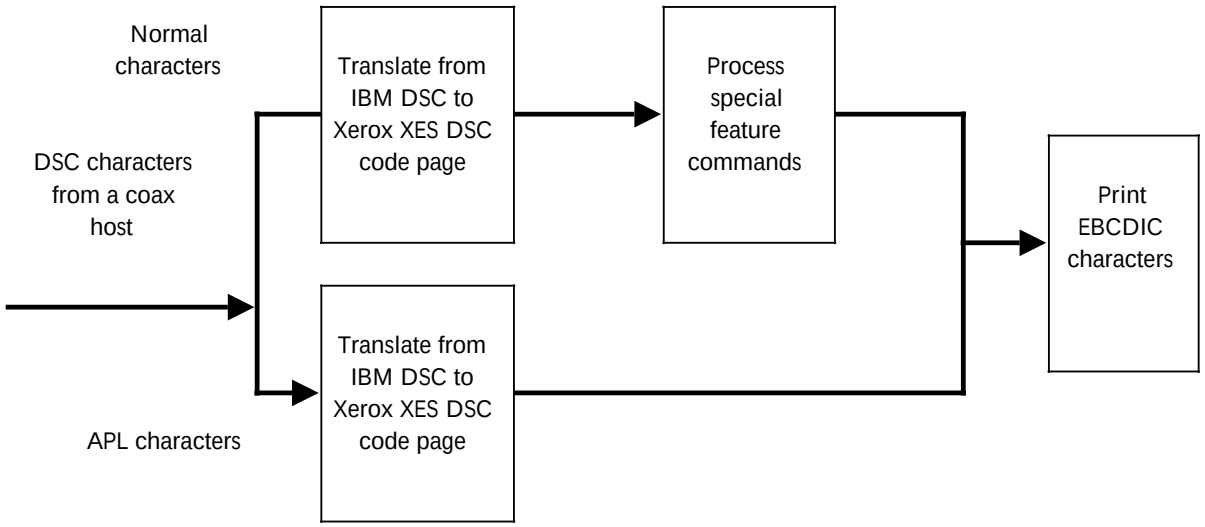


Figure 3-5. **Translation process for the twinax environment**



EBCDIC-DSC mode

Figure 3-6. **Translation process for the coax LU3 environment**



Modes of special feature operation

There are four different ways of operating special features. Special features can be completely disabled or operated in either of two limited modes or operated using all of the features. The limited feature modes are referred to as the Xerox Special Transparent Mode (STM Xerox) and the Rank Xerox Special Transparent Mode (STM Rank Xerox).

Note: When operating in the full feature mode, the functionality available to the you is dependent on the translation mode adopted. Remember that the translation table features are not available when you are operating in either of the two EBCDIC modes.

Select the method of special feature operation at the printer's control panel. This selection process is fully described in your *Xerox 4213 Laser Printer User Guide*.

Xerox Special Transparency mode

Xerox Special Transparency mode allows you to send text, control codes, font data, and graphic data to the printer. When the printer is in this transparency mode, all IBM control codes and commands are stripped from the input data and discarded.

This mode allows you to define command/data in ISO6937 hexadecimal, and text strings in EBCDIC, which can be sent to the printer. This transparency mode is invoked when the Xerox special transparency entry string is detected in the data-stream.

The entry string is:

|¬ (EBCDIC X'4F 5F')

It is terminated by the Xerox Special Transparency mode exit string.

The exit string is:

$ (EBCDIC X'5B')

The format of the data is defined below:

|¬ X'nn' X'nn' "text" 'X'nn' X'nn' "text" $

|¬	The command to enter the Xerox Special Transparency mode.
X'nn'	The hex values which define ISO6937 code points. Only the characters A-F and 0-9 are valid characters for defining the hex codes. All other characters, commands, and control codes are stripped out.
"text"	An EBCDIC text string which must be enclosed in either single or double quotes. Only alphanumeric characters and spaces are allowed between the quotes. These are translated to the equivalent ISO6937 value for printing.
$	The interface escape character which terminates the Xerox Special Transparency mode.

Note: If an error is detected during transparency, for example, an odd number of bytes or a byte not in the range of F0-F9 or C1-C6, an appropriate error message is logged. In this mode hex values between 81-86 are treated as if they are equivalent to C1-C6.

Example: **|¬ 1B 62 'Xerox' 0D 0A 'LASER PRINTERS' 0D 0A 41 42 43 44 1B 2B 50 0D 0A** $

prints the following in bold characters:

Xerox

LASER PRINTERS

ABCD

|¬	Sets the Xerox Special Transparency mode
1B	The hex value for ESC
62	The hex value of the letter b which is the XES command to set bolding
'XEROX'	The word XEROX enclosed in single quotes
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
'LASER PRINTERS'	The words LASER PRINTERS enclosed in single quotes
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
41 42 43 44	The hex values of the letters A, B, C and D
1B 2B 50	The hex values for ESC+P which is the XES command to print
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
$	Exits the Xerox Special Transparency mode

Rank Xerox Special Transparency mode

Rank Xerox Special Transparency mode allows you to send text, control codes, font data and graphic data to the printer. When the printer is in Transparency mode, all IBM control codes and commands are stripped from the input data and discarded.

This mode allows you to define command/data in ISO6937 hexadecimal, and text strings in EBCDIC, which can be sent to the printer. This Transparency mode is invoked when the Rank Xerox special transparency entry string is detected in the datastream.

The entry string is:

? % (EBCDIC X‘6F 6C')

It is terminated by the Rank Xerox Special Transparency mode exit string.

The exit string is:

> (EBCDIC X‘6E')

The format of the data is defined below:

? % X'nn' X'nn' ”text” 'X'nn' X'nn' ”text” >

? %	The command to enter the Rank Xerox Special Transparency mode.
X'nn'	The hex values which define ISO6937 code points. Only the characters A-F and 0-9 are valid characters for defining the hex codes. All other characters, commands, and control codes are stripped out.
”text”	An EBCDIC text string which must be enclosed in either single or double quotes. Only alphanumeric characters and spaces are allowed between the quotes. These are translated to the equivalent ISO6937 value for printing.
>	The interface escape character which terminates the Rank Xerox Special Transparency mode.

Note: If an error is detected during transparency, for example, an odd number of bytes or a byte not in the range of F0-F9 or C1-C6, an appropriate error message is logged. In this mode hex values between 81-86 are treated as if they are equivalent to C1-C6.

Example: **? % 1B 62 'Rank Xerox' 0D 0A 'LASER PRINTERS' 0D 0A 41 42 43 44 1B 2B 50 0D 0A >**

prints the following in bold characters:

Rank Xerox

LASER PRINTERS

ABCD

Where

? %	Sets the Rank Xerox Special Transparency mode
1B	The hex value for ESC
62	The hex value of the letter b which is the XES command to set bolding
'Rank Xerox'	The words Rank Xerox enclosed in single quotes
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
'LASER PRINTERS'	The words LASER PRINTERS enclosed in single quotes
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
41 42 43 44	The hex values of the letters A, B, C and D
1B 2B 50	The hex values for ESC+P which is the XES command to print
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
>	Exits the Rank Xerox Special Transparency mode

Full special feature mode

The following special features are provided:

- Normal mode
- Filter mode
- Transparency mode
- Data Monitor mode
- User-defined strings
- Customised translate tables
- GFID to Xerox font cross reference
- Ability to customise power up default parameters.

The commands which invoke these features are organised under the following headings.

- The interface escape character—page 3-17
- Mode change commands—page 3-18
- User defined strings—page 3-27
- Translate table options—page 3-30
- GFID cross reference table—page 3-40
- Defaults—page 3-41
- Saving default settings—page 3-75.

Most of these features are accessed using the interface escape character; this is described on page 3-17.

Throughout this manual @ has been used as the interface escape character and ***** where the printer escape character has been used in examples.

In chapter 4, ”Applications,” there are some examples which show how the special feature commands are used in conjunction with the XES commands to enable you to make full use of the Xerox printer.

Caution: When combining IBM printer and XES commands, particularly the reset command, E+XL, (carriage return and line feed) and those that move the current print position, always be aware of the new print position. Failure to consider this may give unexpected results, especially as the reset command resets the printer to the system defaults, including fonts and margins.

Table 3-1 provides a summary of all of the special feature commands and their default settings. The table is arranged in the same order as the detailed descriptions. The command description includes the page number where the information can be found.

The interface escape character is represented as **@,** and the letter n indicates that you need to insert a parameter to qualify the command. Refer to the relevant section for details.

Table 3-1. **Summary of special features**

Description of feature	Command	Default
Interface escape character		
Define interface escape character (page 3-17)	&&??@	None
Mode change commands		
Enter Filter mode (page 3-20)	See Set Filter mode entry string	@Y36,1@
Set Filter mode entry string (page 3-20)	@Y200,'<string>'@	@Y36,1@
Exit filter mode (page 3-20)	See Set Filter mode exit string	@Y36,0@
Set Filter mode exit string (page 3-20)	@Y201,'<string>'@	@Y36,0@
Enter Multibyte Transparency mode (page 3-21)	See Set Transparency mode entry string	@@
Set Transparency mode entry string (page 3-21)	@Y202,'<string>'@	@@
Exit Multibyte Transparency mode (page 3-23)	See Set Transparency mode exit string	@
Set Transparency mode exit string (page 3-23)	@Y203,'<string>'@	@
Single Byte Transparency mode (page 3-24)	@nn	None
Enter Data Monitor mode (page 3-25)	@T1,	None
Exit Data Monitor mode (page 3-25)	@T1,	None
User-defined strings		
Download user string (page 3-28)	@Y61,'<string>'@	None
Recall user string (page 3-29)	@Zn	None
Translate table options		
Create translate table (page 3-31)	@Y71,<table no.>@	None
Delete translate table (page 3-31)	@Y72,<table no.>@	None

Table 3-1. **Summary of special features (continued)**

Description of feature	**Command**	**Default**
Modify translate table (page 3-32)	@Y75,<CTT><ISO6937>@	None
Create APL translate table (page 3-34)	@Y76,<table no.>@	None
Delete APL translate table (page 3-34)	@Y77,<table no.>@	None
Select APL translate table (page 3-35)	@Y78,<table no.>@	None
Modify APL translate table (page 3-35)	@Y80,<CTT><APL>@	None
Create OCR translate table (page 3-36)	@Y81,<table no.>@	None
Delete OCR translate table (page 3-37)	@Y82,<table no.>@	None
Select OCR translate table (page 3-38)	@Y83,<table no.>@	None
Modify OCR translate table (page 3-38)	@Y85,<CTT><OCR>@	None
Print translate table (page 3-39)	@T2,	None
GFID cross reference table		
Assign GFID cross reference (page 3-40)	@Y97,<GFID> <fontname/string>@	see chapter 5
Delete GFID assignment (page 3-41)	@Y97,86@	see chapter 5
Defaults—Page format options		
Lines Per Inch (page 3-43)	@Y2,n@	6
Characters Per Inch (page 3-44)	@Y3,n@	10
Line Spacing (page 3-44)	@Y4,n@	1
Page Length (MPL) (page 3-45)	@Y5,n@	66
Maximum Print Position (MPP) (page 3-46)	@Y6,n@	132
LU1 language (page 3-46)	@Y8,n@	14
Top Binding Margin (page 3-47)	@Y110,n@	0
Left Binding Margin (page 3-48)	@Y112,n@	0

Table 3-1. **Summary of special features (continued)**

Description of feature	**Command**	**Default**
Automatic New Page (page 3-49)	@Y34,n@	1
Form Feed usage (page 3-49)	@Y35,n@	0
Automatic New Line (page 3-50)	@Y42,n@	1
Suppress CR's and spaces for same position (page 3-51)	@Y44,n@	0
Intervention Request Timeout (IRQ) (page 3-52)	@Y46,n@	12
Defaults—Page orientation options		
Auto Page Orientation (page 3-53)	@Y98,n,t@	n = 1
Tray Selection (page 3-54)	@Y11,n@	1
Default Tray Orientation (page 3-54)	@Y10,n,t@	n = 2
Defaults—DSC/DSE options		
Case (page 3-61)	@Y7,n@	1
Buffer size (page 3-61)	@Y1,n@	4
Generate new line on receipt of EM (page 3-62)	@Y41,n@	1
Form feed before local copy (page 3-63)	@Y25,n@	0
Form feed after local copy (page 3-64)	@Y26,n@	1
Null suppression (page 3-65)	@Y27,n@	0
Carriage return at MPP+1 (page 3-66)	@Y28,n@	1
New line at MPP+1 (page 3-68)	@Y29,n@	1
Form feed within print buffer (page 3-69)	@Y30,n@	0
Form feed valid (page 3-70)	@Y32,n@	0
Form feed at end of print buffer (page 3-72)	@Y31,n@	1
Automatic form feed at end of buffer (page 3-59)	@Y33,n@	0
Saving default settings		
Save to NVRAM (page 3-75)	@X<n>	None

Interface escape character

Many of the features described in this chapter are accessed by means of escape sequences. To gain access to these features you must define an interface escape character. The first character of all escape sequences is always a special character called the interface escape character. You may define this character by sending the following character sequence from the host:

&&??E

Where E is the single character which is used as the interface escape character and must be in the range X'40' to X'FF'. If a value of X'40' (space character) is used, then the current interface escape character is reset and no interface escape character is defined. For example, to define the interface escape character as '@', the following sequence must be sent:

&&??@

The interface escape character for the remainder of this chapter is '@'.

Notes:

1. You should reset the interface escape character when you are not using the XCTO's special features.
2. XCTO does not pass the interface escape character. Therefore, both the interface and the printer escape character must be different. Only the interface escape character is covered in this document. For details of the Xerox Escape Sequence (XES) printer escape character, see the *Xerox 4213 Laser Printing System Printer Programmer Reference.*

Format of escape sequences

Valid escape sequences must be in one of the following formats:

1. @Y.....@

   Example: Downloading set up parameters

2. @HH where HH is a transparent HEX code

   Example: Single byte transparency

3. @Tn, where n is the number 1 or 2

   Example: Print translate table

4. @Zn where n is a number from 0 to 8

   Example: Recalling parameters

5. @Xn where n is a number from 1 to 4

   Example: Saving set up parameters

An invalid escape sequence of format 1 is discarded without being printed. Formats 3 and 4 are three-byte escape sequences. Invalid three-byte escape sequences are discarded without being printed.

As soon as the interface escape character prints (@ in this document), all spaces and IBM control codes are ignored until the end of the escape sequence.

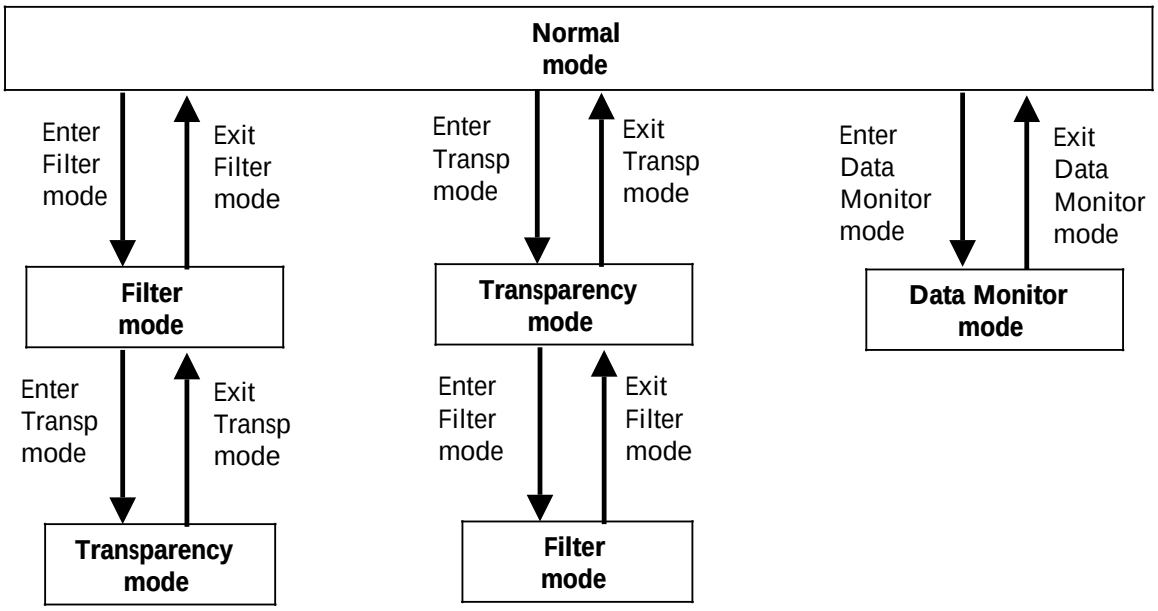
Mode commands

Three modes of operation, available within special features, give maximum flexibility in accessing the printer functions. The interface is always powered up in the Normal mode, which is the default mode of operation. When Normal mode is active, you may switch in and out of the other available modes by sending the commands to enter and exit each mode. The command text strings for entry and exit to each of the modes can be set up by configurable commands.

Table 3-2. **Mode command summary—defaults**

Enter Filter mode	@Y36,1@
Exit Filter mode	@Y36,0@
Enter Transparency mode	@@
Exit Multibyte Transparency mode	@
Single transparent byte	@HH
Data Monitor mode	@T1,

Figure 3-7. **State transition diagram for mode selection**



Normal mode

The interface card processes EBCDIC characters and IBM data-stream commands according to the current settings of the printer. Xerox commands can be accessed by the host, if required, by assigning the =UDK= printer escape character and embedding XES commands within the text sent from the host.

Filter mode

The Filter mode is invoked when the Filter mode entry string is detected in the datastream. Filter mode provides a method of sending text, fonts, and graphics to the printer without being corrupted by IBM commands. Once in the Filter mode, all EBCDIC IBM single-byte and multibyte commands and parameters are removed from the datastream.

The default value is:

@Y36,1@

It is terminated when the Filter mode exit string is detected.

The default value is:

@Y36,0@

To change the default value for entering and exiting the Filter mode, use the following escape sequences:

Set Enter Filter Mode **@Y200,'<string>'@**

Set Exit Filter Mode **@Y201,'<string>'@**

@	The interface escape character
Y200	The command that sets Enter Filter mode
Y201	The command that sets Exit Filter mode
, (comma)	The command delimiter
'<string>'	The command string used to enter or exit the Filter mode. A single or double quote **must** begin and end the string. The strings, up to eight characters long, **must** not be the same for different mode strings, but can be the same for the enter and exit strings of a particular mode. An attempt to set the string for one mode to be the same as for another, or to be the same as the interface escape character, causes the command to be rejected.
@	The interface escape character

Note: In this mode, auto new line and auto new page, if enabled, are ignored. Therefore no new lines or form feeds are added.

Transparency mode

The Transparency mode is invoked when the Transparency mode entry string is detected in the datastream. Transparency mode allows you to send text, ISO6937 control codes, font data, and graphic data to the printer without being corrupted by IBM commands. When the printer is in Transparency mode, all IBM single-byte and multibyte control codes and commands are removed from the input datastream. Transparent data may be sent to the printer either in Multibyte Transparency mode or Single Byte Transparency mode. On terminating the mode, the print position and printer parameters are the same as when the mode was entered.

Multibyte Transparency mode

This mode allows you to define command/data strings, in ISO6937 hexadecimal, which can be sent to the printer. Multibyte Transparency mode is invoked when the Multibyte Transparency mode entry string is detected in the data-stream.

The default value is:

@@

It is terminated by the Multibyte Transparency mode exit string.

The default value is:

@

The format of the data is defined below:

@@ X'nn' X'nn' ”text” 'X'nn' X'nn' ”text”@

@@	The command to enter the Multibyte Transparency mode.
X'nn'	The hex values which define ISO6937 code points. Only the characters A-F and 0-9 are valid characters for defining the hex codes. All other characters, commands, and control codes are stripped out.
”text”	A text string which must be enclosed in either single or double quotes. Only alphanumeric characters and spaces are allowed between the quotes. These are translated to the equivalent ISO6937 value for printing.
@	The interface escape character which terminates the Multibyte Transparency mode.

Note 1: If an error is detected during transparency, for example, an odd number of bytes or a byte not in the range of F0-F9 or C1-C6, an appropriate error message is logged. In this mode hex values between 81-86 are treated as if they are equivalent to C1-C6.

Note 2: In this mode, if auto new line and auto new page are enabled, they are ignored. Therefore no new lines or form feeds are added.

Example: **@@ 1B 62 'XEROX' 0D 0A 'LASER PRINTERS' 0D 0A 41 42 43 44 1B 2B 50 0D 0A @**

prints the following in bold characters:

XEROX

LASER PRINTERS

ABCD

@@	Sets the Multibyte Transparency mode
1B	The hex value for E
62	The hex value of the letter b which is the XES command to set bolding
'XEROX'	The word XEROX enclosed in single quotes
0D 0A	The hex value of the line ending sequence, carriage return/line feed (CR/LF)
'LASER PRINTERS'	The words LASER PRINTERS enclosed in single quotes
0D 0A	The hex value of the line ending sequence, carriage return/line feed (L)
41 42 43 44	The hex values of the letters A, B, C and D
1B	The hex value for E
2B	The hex value for + (plus sign)
50	The hex value of the letter P which is the XES command to print
0D 0A	The hex value of the line ending sequence, carriage return/line feed (L)
@	Exits the Multibyte Transparency mode

Multibyte Transparency mode set up

To change the default value for entering and exiting the Transparency mode, use the following escape sequences:

Set Enter Transparency Mode **@Y202,'<string>'@**

Set Exit Transparency Mode **@Y203,'<string>'@**

@	The interface escape character
Y202	The command that sets Enter Transparency mode
Y203	The command that sets Exit Transparency mode
, (comma)	The command delimiter
'<string>'	The command string used to enter or exit the Transparency mode. A single or double quote **must** begin and end the string. The strings, up to eight characters long, **must** not be the same for different mode strings, but can be the same for the enter and exit strings of a particular mode. An attempt to set the string for one mode to be the same for another, or to be the same as the interface escape character, causes the command to be rejected.
@	The interface escape character

Single Byte Transparency mode

Single Byte Transparency mode sends to the printer ISO6937 control codes which cannot normally be sent in the datastream. The format of the Single Byte Transparency mode is a three-byte sequence as follows:

@X'nn'

The two characters following the interface escape character define an ISO6937 code point. Only the characters A-F and 0-9 are valid characters for defining the hex codes. Invalid sequences are discarded without being printed.

Example: **@0D @0A executes carriage return, line feed.**

Data Monitor mode

The interface card provides an online incoming data monitoring capability for diagnostic purposes. This mode is activated when the Data Monitor entry string is detected.

The command is:

@T1,

It remains active until the exit string is detected.

The command is:

@T1,

While in this mode, XCTO converts each data byte received from the host into a two-byte ISO6937 string representing the hex value of the byte received. It is then formatted and printed.

An example of a part of a data dump is shown in figure 3-8.

Figure 3-8. **Example of data monitor dump**

```
P-1
0     2B C1 14 84 01 84 09 11 19 21   29 31 39 41 49 51 59 61 69 71
      79 81 E2 A3 81 99 A3 0D 15 96   95 85 40 A3 A6 96 40 A3 88 99
      85 85 40 86 96 A4 99 40 86 89   A5 85 40 A2 89 A7 40 A2 85 A5
      85 95 40 85 89 87 88 A3 40 95   89 95 85 40 A3 85 95 40 85 93
      85 A5 85 95 40 A3 A6 85 93 A5   85 40 A3 88 89 99 A3 85 85 95

100   0D 15 86 96 A4 99 A3 85 85 95   40 86 89 86 A3 85 85 95 40 A2
      89 A7 A3 85 85 95 40 A2 85 A5   85 95 A3 85 85 95 40 85 89 87
      88 A3 85 85 95 40 A3 40 95 A3   85 85 95 40 A3 A6 85 95 A3 A8
      40 A3 A6 85 95 A3 A8 60 96 95   85 0D 15 A3 A6 85 95 A3 A8 60
      A3 A6 96 40 A3 A6 85 95 A3 A8   60 A3 88 99 85 85 40 A3 A6 85

200   95 A3 A8 60 86 96 A4 99 40 A3   A6 85 95 A3 A8 60 86 89 A5 85
      40 A3 A6 85 95 A3 A8 60 A2 89   A7 40 A3 A6 85 95 A3 A8 60 A2
      85 A5 85 95 0D 15 A3 A6 85 95   A3 A8 60 85 89 87 88 A3 40 A3
      A6 85 95 A3 A8 60 95 89 95 85   40 A3 88 89 99 A3 A8 0D 15 96
      95 85 40 A3 A6 96 40 A3 88 99   85 85 40 86 96 A4 99 40 86 89

300   A5 85 40 A2 89 A7 40 A2 85 A5   85 95 40 85 89 87 88 A3 40 95
      89 95 85 40 A3 85 95 40 85 93   85 A5 85 95 40 A3 A6 85 93 A5
      85 40 A3 88 89 99 A3 85 85 95   0D 15 86 96 A4 99 A3 85 85 95
      40 86 89 86 A3 85 85 95 40 A2   89 A7 A3 85 85 95 40 A2 85 A5
      85 95 A3 85 85 85 95 40 85 89   88 A3 85 85 95 40 95 89 95 A3

400   85 85 95 40 A3 A6 85 95 A3 A8   40 A3 A6 85 95 A3 A8 60 96 95
      85 0D 15 A3 A6 85 95 A3 A8 60   A3 A6 96 40 A3 A6 85 95 A3 A8
      60 A3 88 99 85 85 40 A3 A6 85   95 A3 A8 60 86 96 A4 99 40 A3
      A6 85 95 A3 A8 60 86 89 A5 85   40 A3 A6 85 95 A3 A8 60 A2 89
      A7 40 A3 A6 85 95 A3 A8 60 A2   85 A5 85 95 0D 15 A3 A6 85 95

500   A3 A8 60 85 89 87 88 A3 40 A3   A6 85 95 A3 A8 60 95 89 95 85
      40 A3 88 89 99 A3 A8 0D 15 96   95 85 40 A3 A6 96 40 A3 88 99
      85 85 40 86 96 A4 99 40 86 89   A5 85 40 A2 89 A7 40 A2 85 A5
      85 95 40 85 89 87 88 A3 40 95   89 95 85 40 A3 85 95 40 85 93
      85 A5 85 95 40 A3 A6 85 93 A5   85 40 A3 88 89 99 A3 85 85 95

600   0D 15 86 96 A4 99 A3 85 85 95   40 86 89 86 A3 85 85 95 40 A2
      89 A7 A3 85 85 95 40 A2 85 A5   85 95 A3 85 85 95 40 85 89 87
      88 A3 85 85 95 40 95 89 95 A3   85 85 95 40 A3 A6 85 95 A3 A8
      40 A3 A6 85 95 A3 A8 60 96 95   85 0D 15 A3 A6 85 95 A3 A8 60
      A3 A6 96 40 A3 A6 85 93 A5 A8   60 A3 88 99 85 85 40 A3 A6 85

700   95 A3 A8 60 86 96 A4 99 40 A3   A6 85 95 A3 A8 60 86 89 A5 85
      40 A3 A6 85 95 A3 A8 60 A2 89   A7 40 A3 A6 85 95 A3 A8 60 A2
      85 A5 85 95 0D 15 A3 A6 85 95   A3 A8 60 85 89 87 88 A3 40 A3
      A6 85 95 A3 A8 60 95 89 95 85   40 A3 88 89 99 A3 A8 0D 15 96
      95 85 40 A3 A6 96 40 A3 88 99   85 85 40 86 96 A4 99 40 86 89

800   A5 85 40 A2 89 A7 40 A2 85 A5   85 95 40 85 89 87 88 A3 40 95
      89 95 85 40 A3 85 95 40 85 93   85 A5 85 95 40 A3 A6 85 95 A3
      85 40 A3 88 89 99 A3 85 85 95   0D 15 86 96 A4 99 A3 85 85 95
      40 86 89 86 A3 85 85 95 40 A2   89 A7 A3 85 85 95 40 A2 85 A5
      85 95 A3 85 85 85 95 40 85 89   88 A3 85 85 95 40 95 89 95 A3

900   85 85 95 40 A3 A6 85 95 A3 A8   40 A3 A6 85 95 A3 A8 60 96 95
      85 0D 15 A3 A6 85 95 A3 A8 60   A3 A6 96 40 A3 A6 85 95 A3 A8
      60 A3 88 99 85 85 40 A3 A6 85   95 A3 A8 60 86 96 A4 99 40 A3
      A6 85 95 A3 A8 60 86 89 A5 85   40 A3 A6 85 95 A3 A8 60 A2 89
      A7 40 A3 A6 85 95 A3 A8 60 A2   85 A5 85 95 0D 15 A3 A6 85 95
```

User-defined strings

User-defined strings allow you to define strings which can be called up by an escape sequence embedded into text from the host.

Up to eight user strings may be defined, stored, and later recalled by sending the escape sequence @Zn:

Where:

@	The interface escape character
n	The number that identifies the string in the range 1 to 8. Each string may be up to 256 characters in length.

User-defined strings command summary

Download string	@Y61,n,<string>@
Replay string	@Zn

Download user string

This command allows you to download a string for storage in non-volatile memory (NVRAM). Up to eight strings may be stored.

Command format:

@Y61,n,<string>@

@	The interface escape character
Y61	The command that downloads the user string
, (comma)	The command delimiter
n	The number that identifies the string in the range 1 to 8.
, (comma)	The command delimiter
'<string>'	A series of ISO6937 hex characters or as a text string. A single or double quote **must** begin and end the string.
@	The interface escape character

Note: User-defined string features are not available when the printer is in EBCDIC mode.

Recall user string

This command recalls a string which has been previously saved.

Command format:

@Zn

@	The interface escape character
Z	The command that recalls the user string
n	The number that identifies the string in the range 1 to 8.

Example: The following example defines string number 3 to assign font id number 1 to Titan12iso-P and then selects the font.

@Y61,3,1B,'+1Titan12iso-P',0D,0A,1B,31@

The defined user string number 3 is then incorporated in a text file before the text to be printed.

@Z3

This text is printed in Titan12iso-P when special features are enabled.

The printed output should look similar to the following:

```
This text is printed in Titan12iso-P when
special features are enabled.
```

Note: User defined string features are not available when the printer is set in EBCDIC mode.

Translate table commands

The user can set up customised translate tables for special applications such as downloading fonts or assigning special characters. To define a customised translate table, first send a command to create the table in non-volatile memory (NVRAM), then send a command to select the table, and finally a single command or a series of commands to modify the translate table. An additional command deletes translate tables which are no longer required. A total of 8 translate tables may be stored in non-volatile memory (NVRAM). Each code point in a customised translate table can correspond to up to eight characters. It is important to understand the translation mechanism in order to define a custom translate table (see pages 3-3 to 3-8 for details). Translate tables may be printed under the control of the control panel.

Note: The translate features are not available when the printer is in EBCDIC mode.

The following illustrations show the translation processes according to the mode, ASCII (ISO) or EBCDIC, set at the printer.

Table 3-3. **Translate table command summary**

Create table	@Y71,<n>@
Delete table	@Y72,<n>@
Select table	@Y73,<n>@
Modify table	@Y75,<CTT>,<ISO6937>@
Create APL table	@Y76,<n>@
Delete APL table	@Y77,<n>@
Select APL table	@Y78,<n>@
Modify APL table	@Y80,<CTT>,<APL>@
Create OCR table	@Y81,<n>@
Delete OCR table	@Y82,<n>@
Select OCR table	@Y83,<n>@
Modify OCR table	@Y85,<CTT>,<OCR>@
Print table	@T2,

The following functions concern managing customised translate tables within the system. They are accessible only by commands sent from the host and are not available from the printer control panel.

Create translate table

This command allows you to create a customised translate table in non-volatile memory (NVRAM). The translate table is initialised based on the internal code page 500 (see appendix A) and may be modified by sending modify translate table commands.

Notes: Creating a translate table automatically selects it as the active translate table.

If 8 tables have already been created (that is the total of all tables created by Y71, Y76 and Y81), the user cannot create any more tables and an error is reported. The previously selected table remains active.

Command format

@Y71,<table number>@

@	The interface escape character
Y71	The command that creates the translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Delete translate table

This command deletes a specified translate table.

Command format:

@Y72,<table number>@

@	The interface escape character
Y72	The command that deletes the translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Select translate table

This command causes the specified translate table to become the *active* translate table. Before modifying a table, it must be selected as the active translate table.

Command format:

@Y73,<table number>@

@	The interface escape character
Y73	The command that selects the translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Modify translate table

This command is used to modify entries in the active customised translate table. The modifications become active immediately and are stored directly in non-volatile memory (NVRAM). Up to eight characters may be defined for each code point.

Command format:

@Y75,<CTT>,<ISO6937>@

@	The interface escape character
Y75	The command that modifies the translate table
, (comma)	The command delimiter
<CTT>	The entry in the active custom translate table (EBCDIC code page 500)
, (comma)	The command delimiter
<ISO6937>	The entry in the ISO6937 translate table
@	The interface escape character

More than one code point may be defined at the same time with the ';' and ':' delimiters as follows:

":" A colon separates successive code point translations.

";" A semicolon causes the translation to increment the code point address and treat the next character sequence as the ISO6937 translation for that code point.

Example 1 **Modifying the currently selected ISO6937 translate table to print 'abc' as 'ABC'**

@Y75,81,41;42;43@

This command sets code point 81 (a) to translate to 41 (A), 82 (b) to 42 (B) and 83 (c) to 43 (C).

Example 2 **Modifying the currently selected translate table to print '[$' as 'AD'**

@Y75,4A,41:5B,44@

Code point 4A ([) translates to 41 (A), 5B ($) translates to 44 (d).

Example 3 **Modifying the currently selected translate table to print 'X' as 'Xerox'**

@Y75,E7,58,65,72,6F,78@

Code point E7 (X) translates to the five characters 58 (X), 65 (e), 72 (r), 6F (o) and 78 (x).

Notes The following syntax would achieve the same effect:

@Y75,E7,58 65 72 6F 78@

@Y75,E7,5865726F78@

If you XCTO language is not configured to match the language of your IBM system, the examples given here will not work.

The ISO6937 and EBCDIC code page 500 is found in Appendix A.

Create APL translate table

This command allows you to create a custom translate table in non-volatile memory (NVRAM). The translate table is initialised as code page 310 and may be modified by sending modify translate table commands. Note that creating a translate table automatically selects it as the active translate table.

Note: If 8 tables have already been created (that is the total of all tables created by Y71, Y76 and Y81), the user cannot create any more tables and an error is reported. The previously selected table remains active.

Command format:

@Y76,<table number>@

@	The interface escape character
Y76	The command that creates the APL translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Delete APL translate table

This command deletes the specified translate table.

Command format:

@Y77,<table number>@

@	The interface escape character
Y77	The command that deletes the APL translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Select APL translate table

This command causes the specified translate table to become the active translate table. Before modifying a table, it must be selected as the active translate table.

Command format:

@Y78,<table number>@

@	The interface escape character
Y78	The command that selects the APL translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Modify APL translate table

This command is used to modify entries in the active customised translate table. The modifications become active immediately and are stored directly in non-volatile memory (NVRAM). Up to eight characters may be defined for each code point.

Command format:

@Y80,<CTT>,<APL>@

@	The interface escape character
Y80	The command that modifies the APL translate table
, (comma)	The command delimiter
<CTT>	The entry in the active customised translate table (EBCDIC code page 310)
, (comma)	The command delimiter
<APL>	The entry in the APL translate table
@	The interface escape character

More than one code point may be defined at the same time with the ';' and ':' delimiters as follows.

":" A colon separates successive code point translations.

";" A semicolon causes the translation to increment the code point address and treats the next character sequence as the APL translation for that code point.

Example 1 **Modifying the currently selected APL translate table to print '*A B C*' as '*X Y Z*'**

@Y80,41,D2;D3;D4@

This command sets code point 41 (*A*) to translate to D2 (*X*), 42 (*B*) to D3 (*Y*) and 43 (*C*) to D4 (*Z*).

Example 2 **Modifying the currently selected APL translate table to print '*A Z*' as '*Z A*'**

@Y80,41,D4:69,A3@

Code point 41 (*A*) translates to D4 (*Z*), 69 (*Z*) translates to A3 (*A*).

Example 3 **Modifying the currently selected APL translate table to print '*A*' as '*A P L*'**

@Y80,41,A3,C4,C0@

Code point C1 (*A*) translates to the three characters A3 (*A*), C4 (*P*) and C0 (*L*).

Note: The ASCII and EBCDIC APL code page 310 is found in Appendix A.

Create OCR translate table

This command allows you to create a customised translate table in non-volatile memory (NVRAM). The translate table is initialised as code page 892 and may be modified by sending modify translate table commands.

Notes: Creating a translate table automatically selects it as the active translate table.

If 8 tables have already been created (that is the total of all tables created by Y71, Y76 and Y81), the user cannot create any more tables and an error is reported. The previously selected table remains active.

Command format:

@Y81,<table number>@

@	The interface escape character
Y81	The command that creates the OCR translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Delete OCR translate table

This command deletes the specified translate table.

Command format:

@Y82,<table number>@

@	The interface escape character
Y82	The command that deletes the OCR translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in range 1 to 8
@	The interface escape character

Select OCR translate table

This command causes the specified translate table to become the active translate table. Before modifying a table, it must be selected as the active translate table.

Command format:

@Y83,<table number>@

@	The interface escape character
Y83	The command that selects the OCR translate table
, (comma)	The command delimiter
<table number>	The number that identifies the translate table in the range 1 to 8.
@	The interface escape character

Modify OCR translate table

This command is used to modify entries in the active customised translate table. The modifications become active immediately and are stored directly in non-volatile memory (NVRAM). Up to eight characters may be defined for each code point.

Command format:

@Y85,<CTT>,<OCR>@

@	The interface escape character
Y85	The command that modifies the OCR translate table
, (comma)	The command delimiter
<CTT>	The entry in the active custom translate table (EBCDIC code page 892)
, (comma)	The command delimiter
<OCR>	The entry in the OCR translate table
@	The interface escape character

More than one code point may be defined at the same time with the ';' and ':' delimiters as follows.

":" A colon separates successive code point translations.

";" A semicolon causes the translation to increment the code point address and treat the next character sequence as the OCR translation for that code point.

Example 1 **Modifying the currently selected OCR translate table to print 'abc' as 'ABC'**

@Y75,81,41;42;43@

This command sets code point 81 (a) to translate to 41 (A), 82 (b) to 42 (B) and 83 (c) to 43 (C).

Example 2 **Modifying the currently selected translate table to print 'ad' as 'AD'**

@Y75,81,41:84,44@

Code point 81 (a) translates to 41 (A), 84 (D) translates to 44 (d).

Example 3 **Modifying the currently selected translate table to print 'X' as 'Xerox'**

@Y75,E7,58,65,72,6F,78@

Code point E7 (X) translates to the five characters 58 (X), 65 (e), 72 (r), 6F (o) and 78 (x).

Note: The ASCII OCR and EBCDIC code page 892 is found in Appendix A.

Print translate table

This command lets the user print a customised translate table which has been saved.

Note: For consistent operation, this command should be terminated with a form feed.

Command format:

@T2,

@	The interface escape character
T2	The command to print the active translate table
, (comma)	The command delimiter

GFID assignment

This command lets the user set up a cross reference table between IBM Global Font Identifiers (GFID's) and Xerox font names, so that Xerox fonts are selected automatically when the corresponding GFID selection command is received from the host. The GFID assignment table is stored in non-volatile memory (NVRAM) and may contain up to 50 GFID assignments.

Command format:

@Y97,<GFID>,<Font name/string>@

@	The interface escape character
Y97	The command that assigns the GFID cross reference
, (comma)	The command delimiter
<GFID>	The GFID number
, (comma)	The command delimiter
<Font name/ string>	The Xerox font name which can also be represented as a string
@	The interface escape character

Example: **@Y97,86,1B'+1Elite12iso-P'@**

This example also assigns GFID number 86 to the Xerox font Elite12iso-P and Elite12iso-L.

Note: Chapter 5 contains details of default GFID/Xerox font name assignments.

Deleting GFID assignment

The factory default GFID settings cannot be deleted but can be reset by assigning an appropriate GFID to no Xerox font name using the GFID assignment command.

Example: **@Y97,86@**

This deletes the Xerox font name associated with IBM GFID number 86.

Set defaults

Parameters are stored in non-volatile memory (NVRAM) and loaded into system memory at power up and at soft reset. The parameters may be set up through the menu structure using the control panel or by sending set up commands from the host computer. Once set, the parameters can also be saved into the non-volatile memory (NVRAM) at the printer's control panel or by using line commands. The parameters, which may be set up, fall into three categories and are described below:

- Page format options
- Page orientation options
- DSC/DSE options.

All of these options can also be set from the printer's control panel. Refer to the *Xerox 4213 Laser Printer User Guide*.

Notes: The options for the suppression of end of line spaces is available only at the printer control panel.

To relate the default setting descriptions to those described at the printer's control panel, refer to the *Xerox 4213 Laser Printer User Guide*.

Table 3-4. **Set defaults command summary**

Setting	Co-ax	Twin-ax
Lines Per Inch	@Y2,6@	@Y2,6@
Characters Per Inch	@Y3,10@	@Y3,10@
Line Spacing	@Y4,1@	n/a
Page Length	@Y5,66@	@Y5,66@
Maximum Print Position	@Y6,132@	@Y6,132@
LU1 Language	@Y8,14@	@Y8,14@
Top Binding Margin	@Y110,0@	@Y110,0@
Left Binding Margin	@Y112,0@	@Y112,0@
Automatic New Page	@Y34,0@	@Y34,0@
Form Feed usage	@Y35,1@	n/a
Automatic New Line	@Y42,1@	@Y42,1@
Suppress CR's+spaces	@Y44,0@	n/a
Intervention Request Timeout	@Y46,12@	n/a
Auto Page Orientation (all trays)	@Y98,1@	@Y98,1@
Tray Selection	@Y11,1@	@Y11,1@
Tray Orientation (all trays)	@Y10,2@	@Y10,2@
Case	@Y7,1@	n/a
DSC Buffer Size	@Y1,4@	@Y1,4@
New Line on receipt of EM	@Y41,1@	n/a
FF Before Local Copy	@Y25,0@	n/a
FF After Local Copy	@Y26,1@	n/a

Table 3-4. **Set defaults command summary (continued)**

Setting	Co-ax	Twin-ax
Null Line Suppression	@Y27,0@	n/a
CR at Max. Print Pos. + 1	@Y28,0@	n/a
NL at Max. Print Pos. + 1	@Y29,0@	n/a
FF within Print Buffer	@Y30,0@	n/a
FF at End of Print Buffer	@Y31,0@	n/a
FF valid	@Y32,0@	n/a
Auto FF at End of Print Buf	@Y33,0@	n/a

Commands denoted n/a are accepted but not used to determine the appearance of the printed output.

Page format options

Lines Per Inch

This option selects the default value for lines per inch which are used at power up. The factory default setting is 6 lines per inch.

Note: This option has no effect when the 4045 Model 20 emulation is selected.

Command format:

@Y2,n@

@	The interface escape character
Y2	The command that sets the lines per inch
, (comma)	The command delimiter
n	Valid parameters are: 3 for 3 lines per inch (twin-ax only) 4 for 4 lines per inch (twin-ax only) 6 for 6 lines per inch (default) 8 for 8 lines per inch
@	The interface escape character

Characters Per Inch

This option selects the default value for characters per inch which are used at power up. The factory default setting is 10 characters per inch.

Note: This option has no effect when the 4045 Model 20 emulation is selected.

Command format:

@Y3,n@

@	The interface escape character
Y3	The command that sets the characters per inch
, (comma)	The command delimiter
n	Valid parameters are: 10 for 10 characters per inch (default) 12 for 12 characters per inch 15 for 15 characters per inch 16 for 16.7 characters per inch (co-ax only)
@	The interface escape character

Line Spacing

This option controls the power up default value for the number of line feeds which are generated when a new line character is processed. The factory default setting is single line spacing.

Note: Twinax always uses single line spacing.

Command format:

@Y4,n@

@	The interface escape character
Y4	The command that sets the line spacing
, (comma)	The command delimiter
n	Valid parameters are: 1 for single line spacing (default) 2 for double line spacing
@	The interface escape character

Page Length

This option selects the power up default value for the Maximum Page Length (MPL) in units of single line spaces. The factory default setting is 66.

Command format:

@Y5,n@

@	The interface escape character
Y5	The command that sets the page length
, (comma)	The command delimiter
n	The parameter can be between 0 and 255 where: 0 indicates no form feeds will be printed. 1-255 indicates the maximum number of lines allowed on a page before a form feed is generated automatically.
@	The interface escape character

Maximum Print Position

This option selects the maximum print position in characters from the left margin. The factory default setting is 132.

Command format:

@Y6,n@

Where:

@	The interface escape character
Y6	The command that sets maximum print position
, (comma)	The command delimiter
n	The parameter can be between 1 and 255
@	The interface escape character

LU1 language

This option selects the LU1 language translate table at power up when the XCTO is operating in its ISO6937 mode. The factory default setting is Multinational.

Command format:

@Y8,n@

Where:

@	The interface escape character
Y8	The command that sets the language
, (comma)	The command delimiter
n	Valid parameters are: 01 for US ENGLISH 03 or 13 for AUSTRIAN/GERMAN 04 for BELGIAN 05 for BRAZILIAN 06 for FRENCH CANADIAN 07 or 8 for DANISH/NORWEGIAN 09 or 10 for FINNISH/SWEDISH 11 or 30 for FRENCH 14 for MULTINATIONAL (default) 15 for ITALIAN 16 for JAPANESE (LATIN characters) 19, 20 or 21 for SPANISH 22 for UK ENGLISH 28 for PORTUGUESE 41 for OCR
@	The interface escape character

Refer to page 5-9 for a comparison between these settings and the IBM code pages supported by XCTO.

Top Binding Margin

This option sets the position of the first print line relative to the top edge of the paper and is measured in hundredths of an inch. The factory default is 00 for both coax and twinax.

Note 1: The top margin parameter of the Set Vertical Format command is added to the Top Binding Margin to determine the first line position except when printing in the Computer Output reduction (COR) mode.

Note 2: This option has no effect when the 4045 Model 20 emulation is selected.

Command format:

@Y110,n@

@	The interface escape character
Y110	The command that sets top binding margin
, (comma)	The command delimiter
n	The parameter can be between 0 and 999
@	The interface escape character

Left Binding Margin

This option sets the position of the first print column relative to the left edge of the paper and is measured in hundredths of an inch. The factory default is 00 for both coax and twinax.

Note 1: The left margin parameter of the Set Horizontal Format command is added to the Left Binding Margin to determine the first column position except when printing in the Computer Output reduction (COR) mode.

Note 2: This option has no effect when the 4045 Model 20 emulation is selected.

Command Format:

@Y112,n@

@	The interface escape character
Y112	The command that sets the left binding margin
, (comma)	The command delimiter
n	The parameter can be between 0 and 999
@	The interface escape character

Automatic New Page

This option, when enabled, counts the number of lines and generates a form feed when the line count equals the page length. Calculations are based on the page length, which can be set at the printer and overridden by the appropriate IBM command, when operating in the SCS mode.

If the 5219 or 3812 emulations receive a Set Page Presentation (SPPS) command, auto new page can be disabled, being reinstated by the Set Vertical Format (SVF) and Set Initial Conditions (SIC) commands. When disabled, no additional form feeds are inserted.

Note: When this option is disabled and the 4045 Model 20 emulation is active, horizontal tabs are not converted to spaces as usual, but are passed to the XES emulation for processing.

Command format:

@Y34,n@

@	The interface escape character
Y34	The command that determines whether the last line feed on page is sent as form feed or not
, (comma)	The command delimiter
n	The parameter can be: 0 for option disabled 1 for enabled/count lines (default)
@	The interface escape character

Form Feed usage

This option, when enabled, converts form feeds sent from the host into the number of line feeds required to reach the end of the page. Therefore, page length is used to calculate the number of line feeds required. Page length can be set at the printer, but can be overridden by the appropriate IBM command when operating in the SCS mode.

Note 1: Twinax emulations always pass host form feeds.

Note 2: This option has no effect when the 4045 Model 20 emulation is selected.

Command format:

@Y35,n@

@	The interface escape character
Y35	The command that determines whether a form feed is converted line feeds or not
, (comma)	The command delimiter
n	The parameter can be: 0 for pass form feed (default) 1 for enabled/count lines
@	The interface escape character

Automatic New Line

When this option is enabled, a new line feed is generated automatically when text is encountered beyond the maximum print position.

If the 5219 or 3812 emulations receive a Set Page Presentation Size (SPPS) command, auto new line is disabled, being reinstated by the Set Horizontal Format (SHF) and Set Initial Conditions (SIC) commands. With this option disabled, text beyond the maximum print position is always clipped.

Command format:

@Y42,n@

@	The interface escape character
Y42	The command that determines whether automatic new line is enabled or not
, (comma)	The command delimiter
n	The parameter can be: 0 for automatic new line disabled 1 for automatic new line enabled (default)
@	The interface escape character

Suppress CRs/spaces that generate same position

This option determines whether or not to suppress carriage returns and spaces, which if acted upon would cause no net carriage movement. If XES-formatted data is corrupted by the previously described carriage movement, enabling this option solves the problem. The default value for this option is disabled.

Note: This command is ignored in the twinax environment.

Command format:

@Y44,n@

@	The interface escape character
Y44	The command that determines if CRs and spaces are suppressed
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled (default) 1 for enabled
@	The interface escape character

Intervention Request (IRQ) timeout

This option allows the user to define the period of time between an event requiring operator intervention has occurred and the sending of an IRQ timeout response to the host. The factory default is 12 which is 1 minute.

Command format:

@Y46,n@

@	The interface escape character
Y46	The command that sets the intervention request timeout
, (comma)	The command delimiter
n	The parameter can be: 0 for no IRQ response 1 to 255 for the timeout period in units of 5 seconds
@	The interface escape character

Notes: This command is ignored in the twinax environment.

If the printer is put into a not ready state for more than 10 minutes, an IRQ occurs independent of this setting except when 'no IRQ' is selected.

The IRQ timeout is rounded up to the nearest minute.

Page orientation options

The following commands set up requirements for page orientation and tray selection.

Auto Page Orientation

This option allows the user to choose between tray orientations based upon the commands received from the host or based upon the orientation set by the default tray orientation. The factory default is enabled.

Note: This option has no effect when the 4045 Model 20 emulation is selected.

Command format:

@Y98,n,t@

@	The interface escape character
Y98	The command that determines whether auto page orientation is enabled or not
, (comma)	The command delimiter
n	The parameter can be: 0 for auto page orientation disabled 1 for auto page orientation enabled (default)
, (comma)	The command delimiter
t	This parameter is for future use and is ignored
@	The interface escape character

Tray Selection

This option allows the user to select *how* the choice of source paper tray is made. The factory default is to use the currently selected tray.

Command format:

@Y11,n@

@	The interface escape character
Y11	The command that determines that tray selection will take place
, (comma)	The command delimiter
n	The parameter can be: 1 for use currently selected tray (default) 2 for use tray 1 only 3 for use tray 2 only 4 for use tray 3 only 5 for use tray 4 only **Note:** The highest value of n is dependent on trays available on the attached printer Invalid selections will default to tray 1
@	The interface escape character

Default Tray Orientation

This option defines the default page orientation associated with tray 1 to n.

Note: This option has no effect when the 4045 Model 20 emulation is selected.

Command format:

@Y10,n,t@

@	The interface escape character
Y10	The command that determines the orientation of tray 1 to n
, (comma)	The command delimiter
n	The parameter can be: 0 for portrait 1 for landscape 2 for computer output reduction (COR) (default)
, (comma)	The command delimiter
t	The parameter which specifies the tray to be used for the orientation option. If this parameter is omitted, the orientation option is used for all trays Values for t are: 1 = tray 1 2 = tray 2 and so on **Note:** The highest value of t is dependent on trays available on the attached printer Invalid selections are ignored
@	The interface escape character

Page orientation algorithm

Page orientation commands define the orientation of the pages which are printed. The final orientation of the output depends on a number of factors. These are listed below in order of priority:

1. If a Host Orientation command has been received
2. If Auto Tray Orientation has been selected
3. The default orientation of the current tray
4. If the page size parameters are valid
5. If draft or letter quality has been selected.

Note 1: For all printer emulations, apart from the 5219 and 3812 emulations (twinax), the print quality is always draft. Draft is the default at power up.

Note 2: The page orientation algorithm is not applicable to the 4045 Model 20 emulation. For this emulation, page orientation is dependent upon the user selected XES font.

For the 5219 and 3812 emulations, the print quality is set by the Page Presentation Media (PPM) command described in chapter 2.

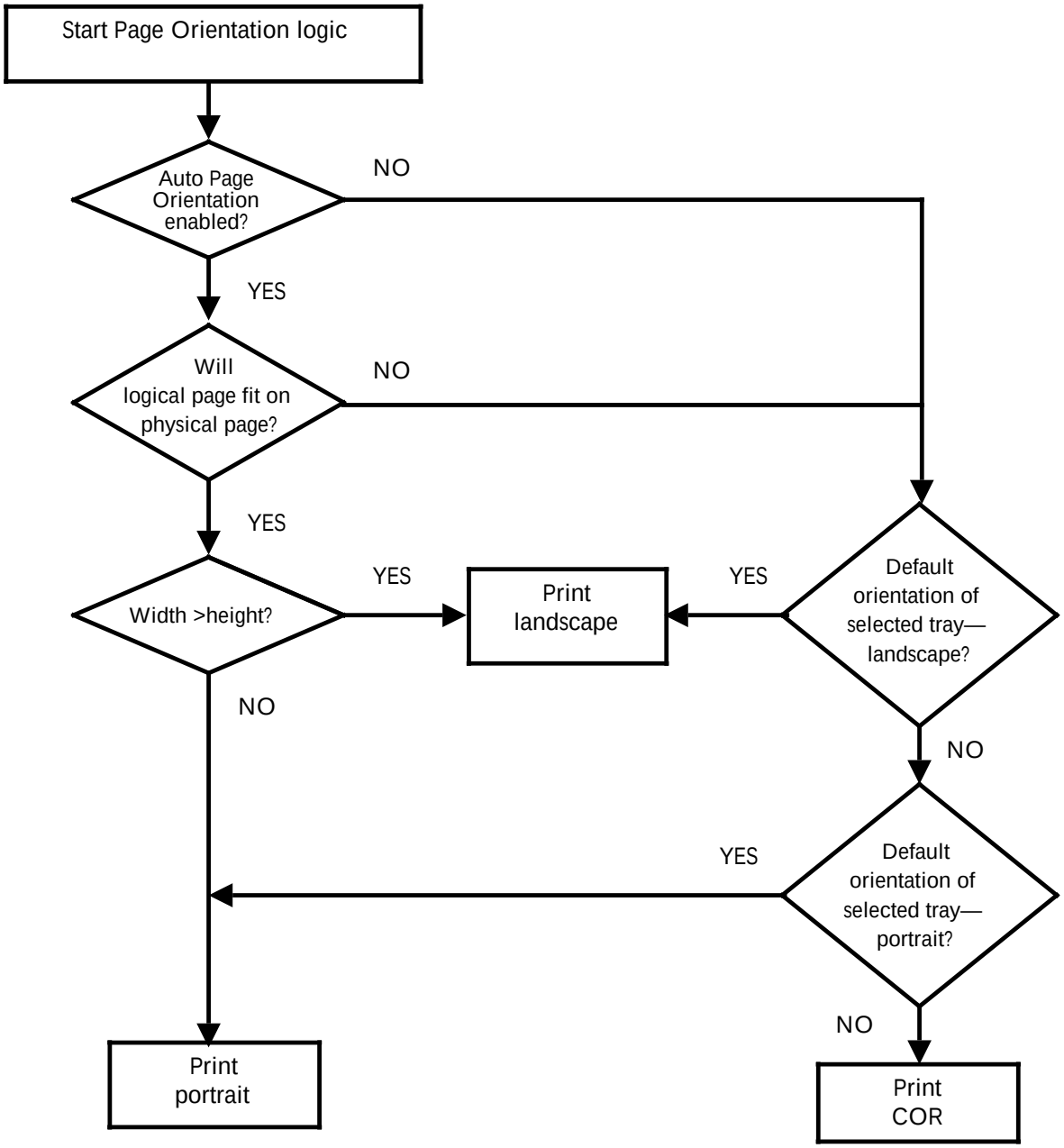
Tray orientation can be portrait, landscape, and computer output reduction (COR). COR is a reduced size copy of the printed output. The characteristics of COR are:

- Landscape orientation.
- A 70% reduction in the size of the logical page. This is accomplished by:
  - — Substituting smaller fonts:
    14 pitch for 10 pitch fonts
    15 pitch for 12 pitch fonts
    20 pitch for 15 pitch fonts
    27 pitch for 17 pitch fonts.
  - — Reducing vertical line spacing to 70% of full size.
  - — 0.5 top and left margins.

The COR fonts may be cross referenced with the full sized fonts listed in the Font and Character Set tables in chapter 5. Refer to table 5-4 under “Font changes.“ 10 pitch ISO for full sized portrait and landscape fonts has a GFID of 11. The corresponding COR font has a GFID of 204. Refer to table 5-1 for default GFID values. A GFID of 11 corresponds to Titan10M, 204 corresponds to XCP14iso.

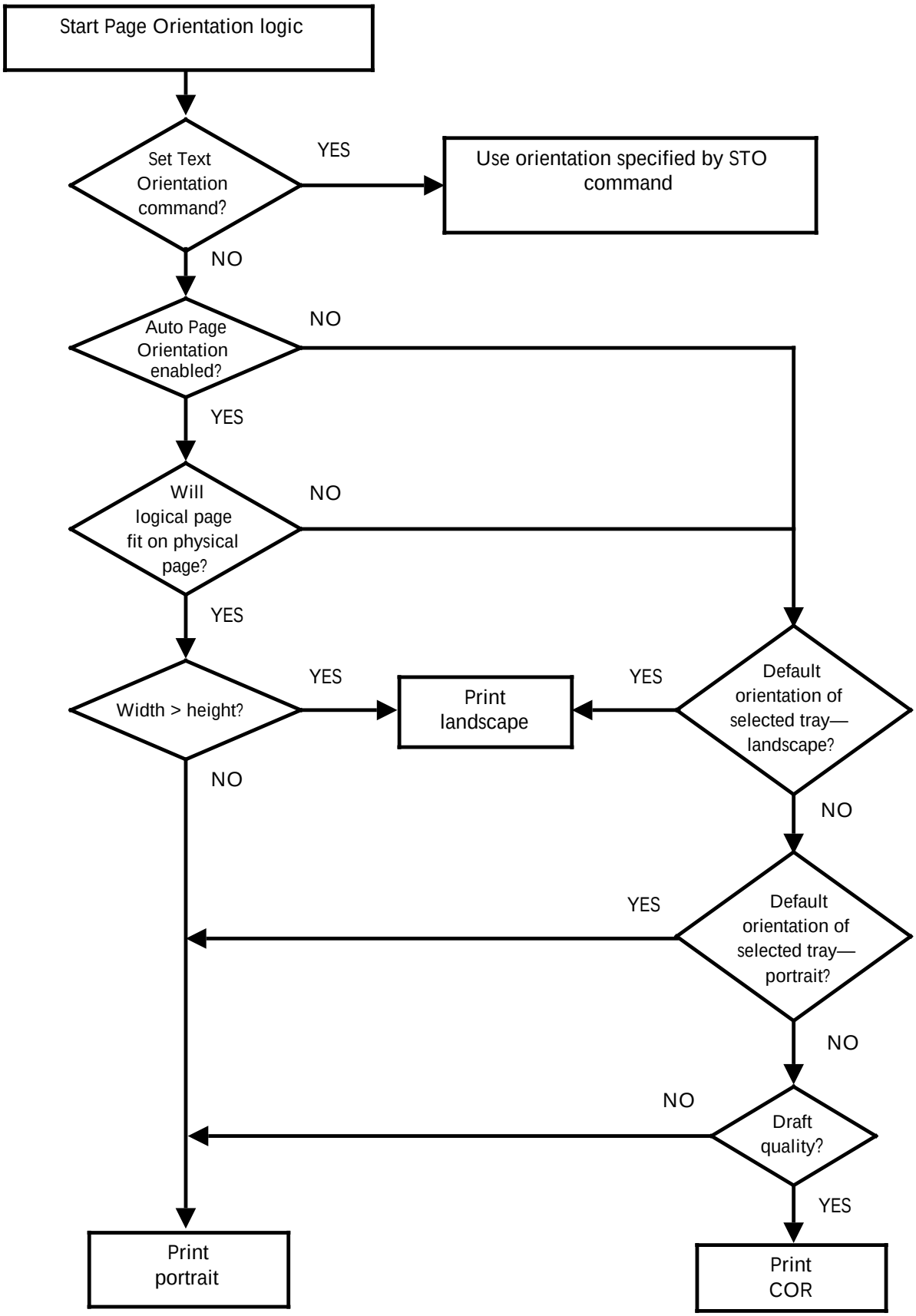
The flow chart in figure 3-9 shows the page orientation algorithm that is used for all the coax printer emulations, and the 4245, 5224, 5225, 5256, 5262, and 6262 twinax emulations.

Figure 3-9. **Page orientation algorithm—1**



The flow chart in figure 3-10 shows the page orientation algorithm used for 5219 and 3812 twinax emulations.

Figure 3-10. **Page orientation algorithm—1**



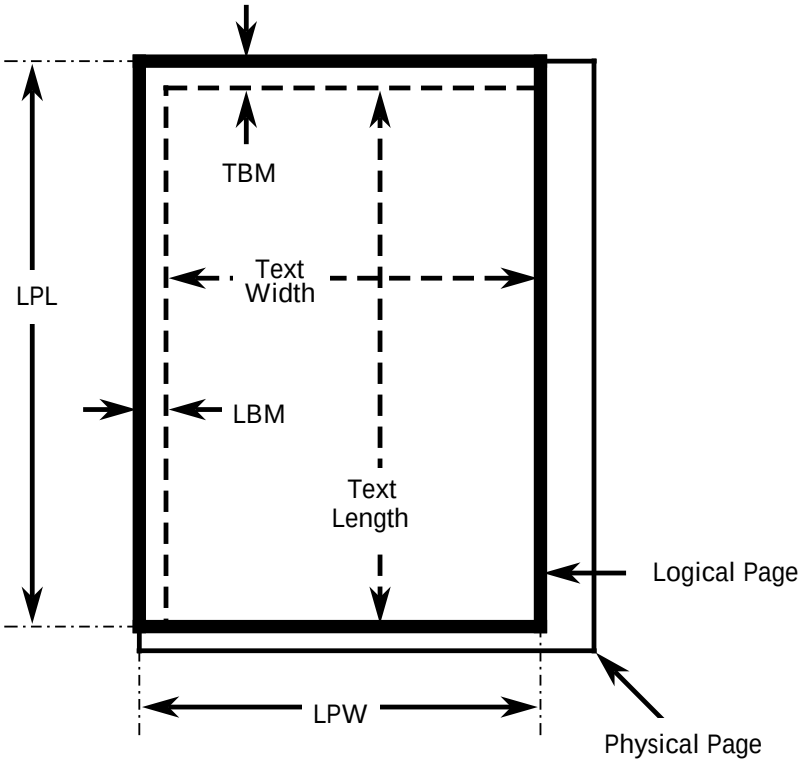
Logical Page Size

The logical page size is used in auto tray orientation. Logical page length (LPL) and logical page width (LPW) determine the logical page size.

LPL is governed by the top binding margin (TBM) and the length of the printable text. The text length is determined by the number of lines per inch (LPI) and the maximum page length (MPL). The mathematical relationship is: LPL = TBM + MPL / LPI.

LPW is governed by the left binding margin (LBM) and the width of the printable text. The text width is determined by the number of characters per inch (CPI) and the maximum print position (MPP). The mathematical relationship is: LPW = LBM + MPP / CPI.

Table 3-5. **Logical page size**



Default values for TBM, LBM, CPI, LPI, MPL and MPP are set by the, LPI, CPI, Page Length and Page Width parameters on the printer control panel or via special feature commands respectively.

When operating in the DSC mode (figure 3-7??), the IBM host may override the MPP defaults.

When operating in the SCS mode (figure 3-7), the IBM Set Horizontal Format commands override the MPP defaults.

- IBM Set Vertical Format commands override the MPL defaults.
- IBM Set Character/Print Density commands override the CPI defaults.
- IBM Set Line Density commands override the LPI defaults.

When operating in the DCA mode (figure 3-11??) the following additional commands effect the output:

- IBM Set Page Presentation Size command overrides both MPP and MPL defaults.
- IBM Set Global Font Identification commands override the CPI defaults.
- IBM Set Single Line Distance commands override the LPI defaults.
- IBM Set Text Orientation command sets the orientation, ignoring the previously discussed settings.
- IBM Page Presentation Media command specifies draft/letter quality, which affects whether COR output is allowed.

Note: SCS and DCA commands override one another, with the last command received at a page boundary being used for page size calculations.

Physical page

Coax: The maximum paper size is taken from the paper in the trays.

Twinax: The maximum paper size is 210 by 330mm.

DSC/ DSE options

These options apply only when the printer is in DSC/DSE mode and therefore *are not applicable to the twinax emulations.*

Case

This option selects mono case or dual case as the power up default setting for the printer. The factory default setting is dual case.

Note 1: This option is used only in Coax DSC/DSE mode and is ignored in Coax SCS.

Note 2: Twinax always uses dual case.

Command format:

@Y7,n@

@	The interface escape character
Y7	The command that sets case
, (comma)	The command delimiter
n	The parameter can be: 0 for mono (upper) case 1 for dual case (default)
@	The interface escape character

Buffer size

This option selects the buffer size the printer uses to print the contents of a terminal screen in DSC or DSE mode. This type of operation is usually done when the user wants to copy the contents of a terminal screen, or the host computer sends data to the printer and the terminal at the same time. *This function also effects the buffer size if in the SCS mode.* The factory default setting is 3440.

Note: For consistent operation, configure the XCTO to match the buffer size required by the host system.

Command format:

@Y1,n@

@	The interface escape character
Y1	The command that sets the buffer size
, (comma)	The command delimiter
n	The parameter can be: 1 for 960 character buffer 2 for 1920 character buffer 3 for 2650 character buffer 4 for 3440 character buffer (default) 5 for 3564 character buffer
@	The interface escape character

Note: This command takes effect only the *next* time that the printing system is initialised and the settings have been saved in non-volatile memory (NVRAM).

Generate new line on receipt of EM

This option determines the action required on receipt of an end of message code. When disabled, the print position remains unchanged. When enabled, a new line is executed providing the current print position is not column 1 .

Command format:

@Y41,n@

@	The interface escape character
Y41	The command that generates a new line on receipt of an end of message code
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled (default) 1 for enabled
@	The interface escape character

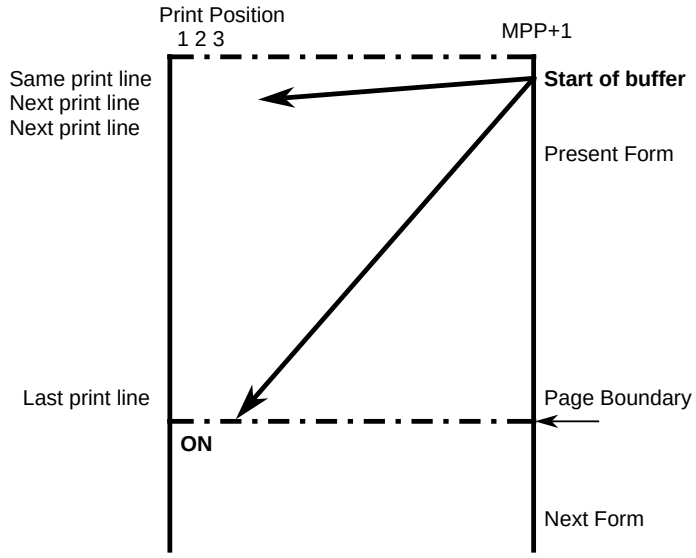
Form feed before local copy

This option determines the print position before an Operator Initiated Local Copy (print screen function).

DISABLED/OFF No automatic form feed is performed (default).

ENABLED/ON Performs an automatic form feed unless a Form Feed command was the last command. The printer is set to print at print position 1 of the first line of the next page.

Example:



Command format:

@Y25,n@

@	The interface escape character
Y25	The command that generates a form feed before an operator initiated local copy
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled (default) 1 for enabled
@	The interface escape character

Form feed after local copy

This option determines the print position after a Local Copy (print screen function).

DISABLED/OFF Defaults to Auto Form Feed at end of print buffer setting (Y33)

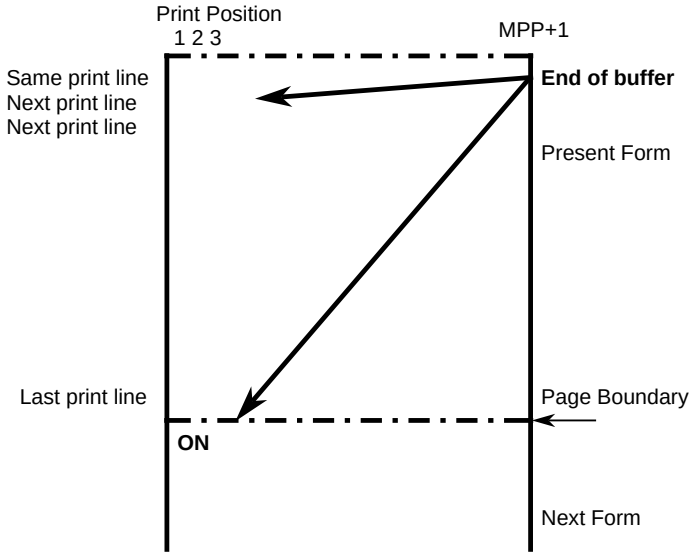
ENABLED/ON Performs an automatic form feed unless Form Feed command was the last received. The printer is set to print at position 1 of the first line of the next page (default).

Note 1: This option corresponds with:

IBM 3268 RPQ SC9508
IBM 3287 RPQ MC3750

Note 2: It is recommended that this option remain enabled when using the 4045 Model 20 emulation.

Example:



Command format:

@Y26,n@

Where:

@	The interface escape character
Y26	The command that generates a form feed after an operator initiated local copy
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled 1 for enabled (default)
@	The interface escape character

Null suppression

This option specifies how nulls are handled. The factory default is always for null line suppression.

Note: This option corresponds with:

IBM 3268 RPQ SC9505
IBM 3287 RPQ SC3741

Command format:

@Y27,n@

Where:

@	The interface escape character
Y27	The command that specifies how nulls are handled
, (comma)	The command delimiter
n	The parameter can be: 0 for null lines are always suppressed 1 for null lines suppressed for host directed copy only 2 for null lines suppressed only in local copy mode 3 for null lines never suppressed 4 for null characters suppressed
@	The interface escape character

Carriage return at maximum print position+1

This option controls the printer action when a carriage return occurs at the MPP+1.

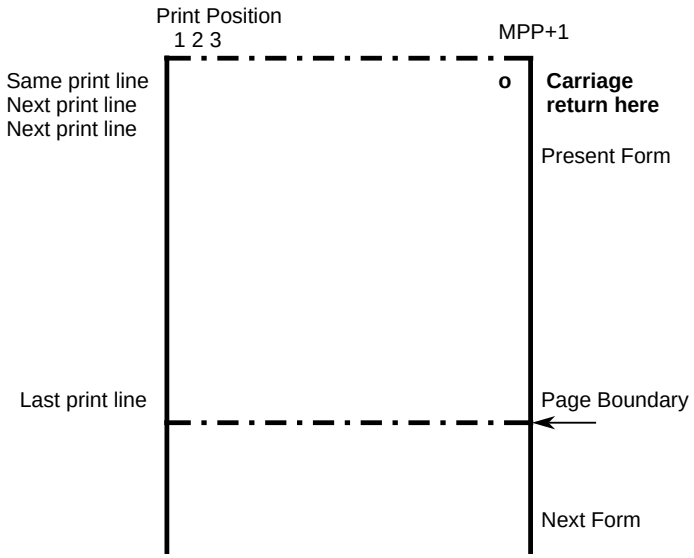
DISABLED/OFF The printer performs a new line when a carriage return occurs at MPP+1. The printer is set to print at position 1 of the next line.

ENABLED/ON The printer performs only a carriage return when this command occurs at MPP+1. The printer is set to print at print position 1 of the same line (default).

Note: This option corresponds with:

IBM 3268 RPQ SC9501
IBM 3287 RPQ S30219
IBM 4214 OPT 15=1

Example:



Command format:

@Y28,n@

@	The interface escape character
Y28	The command that controls the carriage return at the logic area to the end of a print line
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled 1 for enabled (default)
@	The interface escape character

New line at maximum print position+1

This option controls how many lines are skipped when a new line occurs at MPP+1.

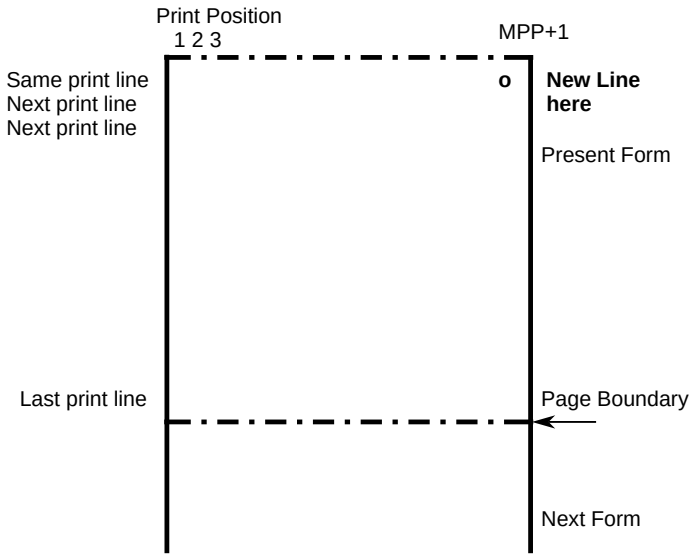
DISABLED/OFF Adds an extra line to the New Line command occurring at MPP+1. The printer is set to print at position 1 of the line after next.

ENABLED/ON Executes only the New Line command when this command occurs at MPP+1. The printer is set to print at print position 1 of the next line (default).

Note: This option corresponds with:

IBM 3268 RPQ SC9502
IBM 3287 RPQ S30219
IBM 4214 OPT 15=1

Example:



Command format:

@Y29,n@

@	The interface escape character
Y29	The command that controls how many lines are skipped when the carriage returns to a new line
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled 1 for enabled (default)
@	The interface escape character

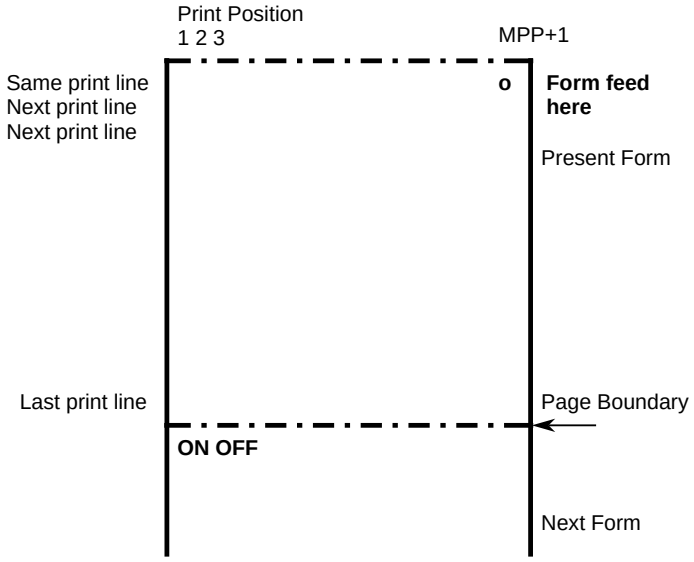
Form feed within the print buffer

This option determines the first print position after the Form Feed command has been executed.

DISABLED/OFF The printer is set to print at position 2 of the first print line of the next page (default).

ENABLED/ON The printer is set to print at position 1 of the first print line of the next page.

Example:



Note: This option corresponds with:

IBM 3268 RPQ SC9503
IBM 3287 RPQ N/A

Command format:

@Y30,n@

@	The interface escape character
Y30	The command that determines the first print position after a Form Feed command.
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled (default) 1 for enabled
@	The interface escape character

Form feed valid

This option determines when the position of Form Feed command effects its execution.

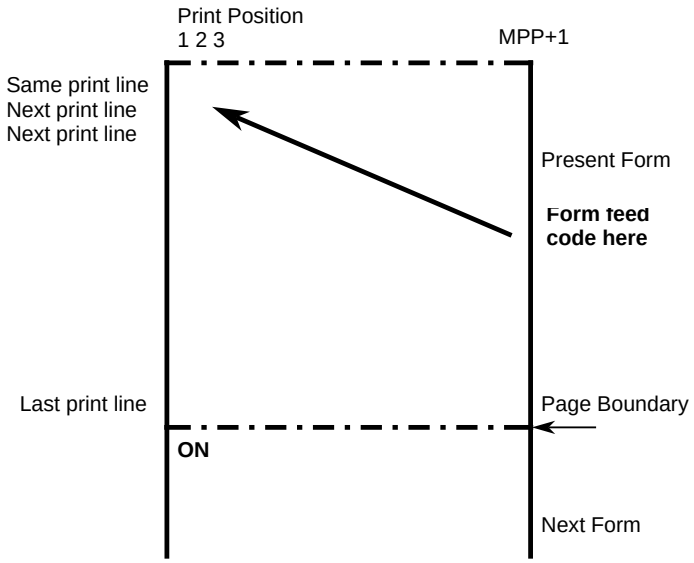
DISABLED/OFF The printer performs Form Feed command only when the command occurs at the first position of a line or at MPP+1. A Form Feed command at any other position is printed as a space (default).

ENABLED/ON The printer performs Form Feed command wherever the command occurs in the print buffer. The printer is set to print at position 1 of the next page.

Note: This option corresponds with:

IBM 3268 RPQ SC9506
IBM 3287 RPQ SC3739

Example:



Command format:

@Y32,n@

@	The interface escape character
Y32	The command that determines if position of Form Feed command affects execution.
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled (default) 1 for enabled
@	The interface escape character

Form feed at end of print buffer

This option determines the print line position when a Form Feed command is the last found in the print buffer, or is immediately followed by an end of message code.

DISABLED/OFF Automatically adds a new line to a Form Feed command at the end of the print data. The printer is set to print at position 1 of the second line of the next page.

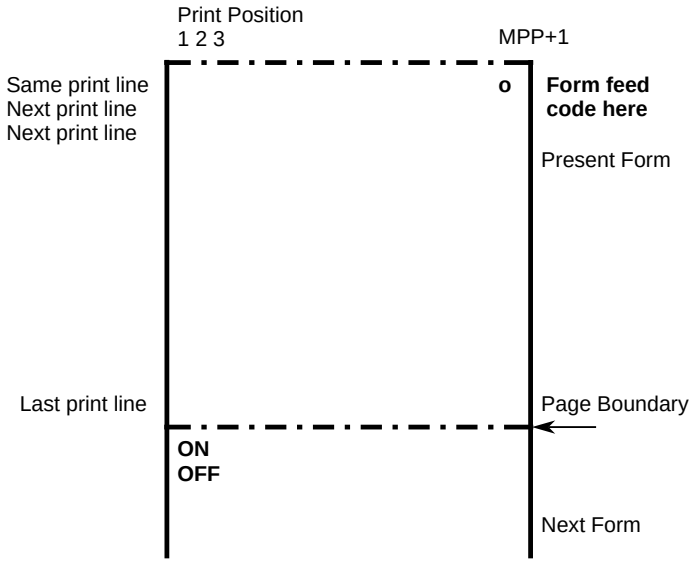
ENABLED/ON Executes only a Form Feed command. The printer is set to print at position 1 of the first print line of the next form (default).

This option is ignored if Automatic Form Feed at End of Buffer (Y33) is ENABLED or Form Feed After Local Copy (Y26) is ENABLED.

Note: This option corresponds with:

IBM 3268 RPQ SC9504
IBM 3287 RPQ SC3749

Example:



Command format:

@Y31,n@

@	The interface escape character
Y31	The command that determines the print line position when Form Feed command is the last code found in the print buffer or is immediately followed by an end of message code
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled 1 for enabled (default)
@	The interface escape character

Automatic form feed at end of print buffer

This option determines the print position after the print buffer is completed or after an end of message is received.

DISABLED/OFF On completion of the print buffer, an Automatic New Line is performed unless the last command executed was Form Feed, the last print position is at position 1, or the New Line on Receipt of EM option (Y41) is disabled. If Form Feed is the last character in the buffer, the end of printer buffer options (Y31) is checked (default).

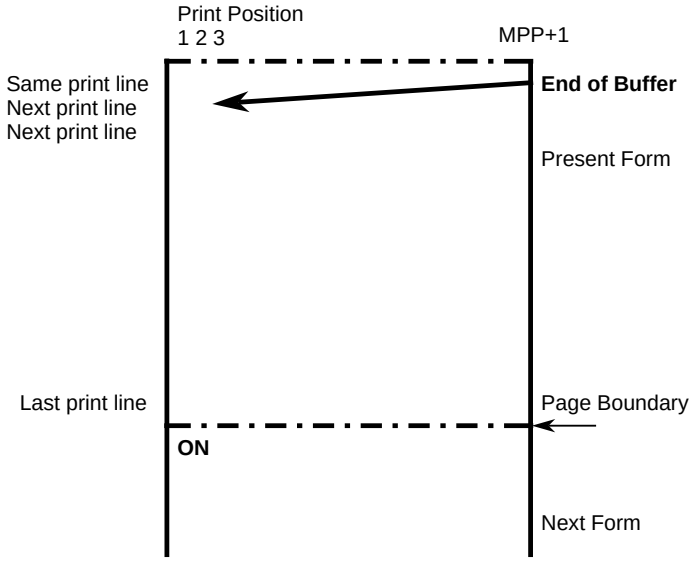
ENABLED/ON On completion of the print buffer, an Automatic Form Feed is performed unless Form Feed was the last command in the buffer. The printer is set at print position 1 of the first line of the next page.

This option is ignored if Form Feed After Local Copy (Y26) is ENABLED.

Note: This option corresponds with:

IBM 3268 RPQ SC9507
IBM 3287 RPQ SC3740

Example:



Command format:

@Y33,n@

@	The interface escape character
Y33	The command that determines the next print position after the print buffer is completed
, (comma)	The command delimiter
n	The parameter can be: 0 for disabled (default) 1 for enabled
@	The interface escape character

Save to NVRAM

This command saves the software commands in the XCTO's non-volatile memory (NVRAM). The commands concerned were those that were discussed under "Set defaults" in this chapter and those set at the printer's control panel, Once saved, the settings are not lost when the printer is powered down.

The command is:

@X<n>

Where *n* is

1	Saves all current settings, except the interface escape character in NVRAM
2	Saves all current settings in NVRAM including the interface escape character
3	Saves the factory default settings in NVRAM. This action causes the saved software setup commands to be overwritten by the factory default commands, effectively resetting the NVRAM and the RAM
4	Reads the settings currently saved in NVRAM into RAM. This action causes any unsaved settings to be overwritten by the currently saved commands.

Note: These commands have no effect upon the special features options that are available only at the printer control panel.

4. Applications

This chapter describes some considerations needed to gain compatibility with other Xerox products supporting decentralised printers. It provides some instructions for the downloading of 4045 model 20 and IDATA compatible fonts and graphics, as well as suggestions to be considered when using Xerox Escape Sequences (XES).

At the end of the chapter are some examples of documents created using XES commands through the XCTO interface.

Downloading fonts and graphics

XCTO supports several methods for downloading fonts and graphics. The two most commonly used are described on the following pages.

Fonts—4045 Model 20 compatibility

The fonts are stored on the host system as EBCDIC sixel-encoded fonts. The fonts have been encoded at the host using a special translate table, and are decoded at the printer using a complementary font/graphic translate table. The special translate table is shown in Appendix A.

This method is recommended for downloading fonts through the XCTO interface.

The XES command sequence required to download the font is:

=UDK=+F<LE>**
<encoded font data>*+P<LE>

=UDK=	The XES command which defines the XES escape character
*****	The user-defined XES escape character
+F	The XES font load command
<LE>	The Carriage Return/Line Feed (CR/LF) required to terminate this XES command
<encoded font data>	The sixel-encoded font data
*****	The user-defined XES escape character
+P	The XES print command used as a job delimiter
<LE>	The Carriage Return/Line Feed (L) required to terminate this XES command

For full details of XES commands, refer to the *Xerox 4213 Laser Printer User Guide*.

In this mode the font/graphic translate table is invoked automatically after the *next* line end following a load font (*+F) or add font (*+A) command.

The font download is terminated on receipt of the next user-defined escape character. Any XES job command can be used to terminate the font download and automatically restore the normal translation process.

When the font downloading is in progress, all IBM commands are filtered out and ignored.

Notes:

1. The XES user-defined escape character must not appear in the font translate table.
2. If the font is encoded correctly, the font data starts with the three characters *iig* and ends with the characters *TTTT*

Fonts—IDATA compatibility

The fonts are stored on the host system as double-byte sixel-encoded fonts. These are generated by the conversion of each byte of an ASCII sixel-encoded font to two EBCDIC bytes representing the hexadecimal value of each character.

The XES command sequence required to download the font is:

&&??@
=UDK=+F,@@0D0A**
<encoded font data>@*+P@@0D0A@.

&&??	The command which defines the interface escape character
@	The user-defined interface escape character
=UDK=	The XES command which defines the XES escape character
*	The user-defined XES escape character
+F	The XES font load command
@@	Two user defined interface escape characters to invoke the transparency mode
0D0A	The hexadecimal value of the carriage return/ line feed (L) sequence
<encoded font data>	The double-byte sixel-encoded font data
@	The user-defined interface escape character to exit the transparency mode
*	The user-defined XES escape character
+P	The XES print command, used as a job delimiter
@@	Two user defined interface escape characters to invoke the transparency mode
0D0A	The hexadecimal value of the carriage return/ line feed (L) sequence
@	One user defined interface escape character to exit the transparency mode

For full details of XES commands, refer to the *Xerox 4213 Laser Printer User Guide*.

When the font downloading is in progress, all IBM commands are filtered out and ignored.

Notes:

1. The XES user-defined escape character must not appear in the font translate table.
2. If the font is encoded correctly, the font data starts with the three characters *696967* and ends with the characters *848484.*

Graphics—4045 Model 20 compatibility

The graphics are stored on the host system as EBCDIC sixel-encoded fonts. The graphics have been encoded at the host using a special translate table and are decoded at the printer using a complementary font/graphic translate table. The special translate table is shown in Appendix A.

This method is recommended for downloading graphics through the XCTO interface.

The XES command sequence required to download the graphic is:

=UDK=gw<M>;<X>,<Y>,<Sx>,<Sy><LE>**
<encoded graphic data>*+P<LE>

=UDK=	The XES command which defines the XES escape character
*****	The user-defined XES escape character
gw	The XES graphics window command
<M>;<X>, <Y>,<Sx>, <Sy>	The XES graphic window parameters
<LE>	The Carriage Return/Line Feed (L) required to terminate these XES command
<encoded graphic data>	The sixel encoded graphic data
*****	The user-defined XES escape character
+P	The XES print command, used as a job delimiter
<LE>	The Carriage Return/Line Feed (L) required to terminate these XES command

For full details of XES commands, see the documentation supplied with the printer.

In this mode the font/graphic translate table is invoked automatically after the **next** line end following a graphic window (*gw) command.

The graphic window command is terminated automatically and the original translation table restored when the correct number of encoded graphic bytes have been received.

When the font downloading is in progress, all IBM commands are filtered out and ignored.

Note: Both the XES user-defined escape character and the interface user-defined escape character must not appear in the font/graphic translate table.

Graphics—IDATA compatibility

The graphics are stored on the host system as double-byte sixel-encoded graphics. These are generated by the conversion of each byte of an ASCII sixel-encoded font to two EBCDIC bytes representing the hexadecimal value of each character.

The XES command sequence required to download the graphic is:

```
&&??@
=UDK=**gw<M>;<X>,<Y>,<Sx>,<Sy>,@@0D0A
<encoded graphic data>@*+P@@0D0A@
```

&&??	The command which defines the interface escape character
@	The user-defined interface escape character
=UDK=	The XES command which defines the XES escape character
*	The user-defined XES escape character
gw	The XES graphics window command
<M>;<X>, <Y>,<Sx>, <Sy>	The XES graphic window parameters
@@	Two user defined interface escape characters to invoke transparency mode
0D0A	The hexadecimal value of the carriage return/ line feed sequence
<encoded graphic data>	The double byted sixel encoded graphics data
@	The user-defined interface escape character
*	The user-defined XES escape character
+P	The XES print command, used as a job delimiter
@@	Two user defined interface escape characters to invoke the transparency mode
0D0A	The hexadecimal value of the carriage return/ line feed sequence
@	One user defined interface escape character to exit the transparency mode

For full details of XES commands, refer to the *Xerox 4213 Laser Printer User Guide*.

When the graphic downloading is in progress, all IBM commands are filtered out and ignored.

Note: The XES user-defined escape character must not appear in the font translate table.

Sample documents

The following pages contain examples of documents that have been coded using XES commands and sent to the Xerox printer using the special features provided by the XCTO interface.

Because of the page size of this manual, some lines of coding may appear on two or more lines which must be entered on one line.

Notes: All of the following samples were produced on a Xerox 4213 laser printer in the XES emulation, with the Coax IBM settings of IBM 3812/3816, Multinational Language, and Full Feature (selected under Special Features).

Samples 1, 2 and 4 use some nonresident fonts (such as Times24:6-L in sample 4). Any substitution of fonts in the samples may require code modification for the files to print correctly.

Sample 1—Merged letter

Sample 1 shows the XES merge command being used in conjunction with Office 400.

Examples of two such merged letters are shown on the following pages.

Caution: When combining IBM printer and XES commands, particularly the reset command, E+XL, (carriage return and line feed) and those that move the current print position, always be aware of the new print position. Failure to consider this may give unexpected results, especially as the reset command resets the printer to the system defaults, including fonts and margins.

=UDK=*&&??@*+M@@0D 0A@*+12700Optima12B-P@@0D 0A@*1

January 1, 1990

(name)

(street)
(city, state)

You have been selected to win one of our wonderful prizes. All you need to do to qualify is schedule an appointment with us to hear all about our wonderful vacation homes at Lake Fabulous.

Please call us immediately so we may book your appointment.

Very truly yours,

Steve Smith
*+P
*+P
*ze

Mr. Neil Silver

3770 Grant Avenue
La Habra, CA 90632

Dear Mr. Silver:
*+P

Ms. Noreen Wilson

472 S.W. Post Street
Albany, OR 97322

Dear Ms. Wilson:
*+P
*+V

Figure 4-1. **Sample 1a—Merged letter**

January 1, 1990

Mr. Neil Silver

3770 Grant Avenue
La Habra, CA 90632

Dear Mr. Silver:

You have been selected to win one of our wonderful prizes. All you need to do to qualify is schedule an appointment with us to hear all about our wonderful vacation homes at Lake Fabulous.

Please call us immediately so we may book your appointment.

Very truly yours,

Steve Smith

Figure 4-2. **Sample 1b—Merged letter**

January 1, 1990

Ms. Noreen Wilson

472 S.W. Post Street
Albany, OR 97322

Dear Ms. Wilson:

You have been selected to win one of our wonderful prizes. All you need to do to qualify is schedule an appointment with us to hear all about our wonderful vacation homes at Lake Fabulous.

Please call us immediately so we may book your appointment.

Very truly yours,

Steve Smith

Sample 2—Export form

Sample 2 shows a form produced using XES commands within Displaywrite/36 through the XCTO's filter mode on an IBM system which uses the UK English code page. A reduced copy of this sample is shown in figure 4-3.

Caution: When combining IBM printer and XES commands, particularly the reset command, E+XL, (carriage return and line feed) and those that move the current print position, always be aware of the new print position. Failure to consider this may give unexpected results, especially as the reset command resets the printer to the system defaults, including fonts and margins.

This file contains all of the XES commands to create the form, and the special feature commands required to customise a translation table and use the filter mode.

```
&&??@@Y71,3@@Y75,7B,0D0A@@Y36,1@@Y2,6@
=UDK=*#
*zf*m3508,0,0,0,2450#
*+2Titan20M-P#
*+3Titan10M-P#
*+4Titan15M-P#
*+5Titan12M-P#
*+6Titan10M-P#
*6
*x10,990,2390,5#
*x10,890,2390,5#
*x240,3190,2160,5#
*x240,2890,2160,5#
*x240,2390,2160,5#
*x240,2090,2160,5#
*x240,1990,2160,5#
*x240,1540,2160,5#
*x240,2590,1080,5#
*x240,2290,540,5#
*x240,2190,1080,5#
*x1050,490,1350,5#
*x1050,290,540,5#
*x1320,2690,1080,5#
*x1320,2490,1080,5#
*x1590,3090,810,5#
*x1590,2990,810,5#
*x1590,1790,810,5#
*x1590,1640,810,5#
*x1590,790,810,5#
*y240,990,2205,5#
*y780,1990,400,5#
*y1050,290,200,5#
*y1320,1990,1200,5#
*y1590,90,400,5#
*y1590,790,200,5#
*y1590,1540,450,5#
```

```
*y1590,2990,200,5#
*y1590,1540,100,5#
*y1860,1540,100,5#
*y1860,1790,300,5#
*y1860,2890,100,5#
*y2130,1540,100,5#
*y2130,1790,200,5#
*y2400,90,3105,5#
*5*a40,2800#
*3*a850,3200#
*bEXPORT CARGO SHIPPING INSTRUCTIONS*p#
*2*a250,3160#
Export/Shipper (Name and Address)#
*a1330,3160#
For F/Agents Use#
*a1600,3060#
Exporters Reference#
*a1870,2960#
S.S. Co. Bkg. No.#
*a250,2860#
Consignee (If Order State Notify Party and Address)#
*a1330,2860#
Other Address#
*a250,2560#
Forwarding Agent/Merchant#
*a1330,2460#
Country of Origin of Goods#
*a1870,2460#
Country of Final Destination#
*a250,2360#
Receiving Dates#
*a790,2360#
Berth and Dock Container Base etc.#
*a250,2260#
Dispatched By#
*a250,2160#
Port of Loading#
*a250,2060#
Port of Discharge#
*a790,2060#
Place of Delivery#
*a250,1960#
Marks and Numbers: No. and Kind of Packages: Description of
Goods (specify hazard if any)#
```

```
*a1600,1960#
TT Code No.#
*a1870,1960#
Gross Wt. Kg.#
*a2180,1960#
Cube (MxM)#
*a1870,1610#
Net Wt. Kg#
*a2150,1610#
FCB Value#
*a10,960#
Special Stowage#
*a1600,960#
Invoice Price#
*a1600,860#
I/We declare that the above particulars are correct &#
*a1600,835#
agree to your Published regulations and Condictions#
*a1600,810#
(including those as to Liability)#
*a1060,460#
Ocean Freight Payable At#
*a1600,460#
Name of Contact and Telephone Number#
*a1060,360#
Number of Bills of Lading Required#
*a1250,310#
Orig.#
*a1520,320#
Copy#
*a1600,160#
Signature#
*a120,2710#
*6To->
*+X#
@Y71,3@@Y36,0@&&??
```

Figure 4-3. **Sample 2—Export form**

EXPORT CARGO SHIPPING INSTRUCTIONS

To->

Export/Shipper (Name and Address)

For F/Agents Use

Exporters Reference

S.S. Co. Bkg. No.

Consignee (If Order State Notify Party and Address)

Other Address

Forwarding Agent/Merchant

Country of Origin of Goods

Country of Final Destination

Receiving Dates

Berth and Dock Container Base etc.

Despatched By

Port of Loading

Port of Discharge

Place of Delivery

Marks and Numbers: No. and Kind of Packages: Description of Goods (specify hazard if any)

TT Code No.

Gross Wt. Kg.

Cube (MxM)

Net Wt. Kg.

FCB Value

Special Stowage

Invoice Price

I/We declare that the above particulars are correct & agree to your Published regulations and Condictions (including those as to Liability)

Ocean, Freight Payable At

Number of Bills of Lading Required

Orig.

Copy

Name of Contact and Telephone Number

Signature

Sample 3—Bar chart

Sample 3 shows a bar chart produced using the XES commands within FSEDIT on an IBM system with IBM Language mapping set to Multinational.

Caution: When combining IBM printer and XES commands, particularly the reset command, E+XL, (carriage return and line feed) and those that move the current print position, always be aware of the new print position. Failure to consider this may give unexpected results, especially as the reset command resets the printer to the system defaults, including fonts and margins.

The first file is sent to create and modify translate table 2 such that the $ is recognised as a L (carriage return and line feed). The translate table is changed back to an unmodified translation table ~~2~~ at the end of the third file, which is also created at this point.

```
&&??@@Y71,1@ @Y71,2@@Y75,5B,0D0A@
```

The second file, which contains all the XES commands to create the chart, is preceded by the IBM customer translation table and filter mode commands.

Note: Unexpected results may occur unless Full Feature is selected under Special Features.

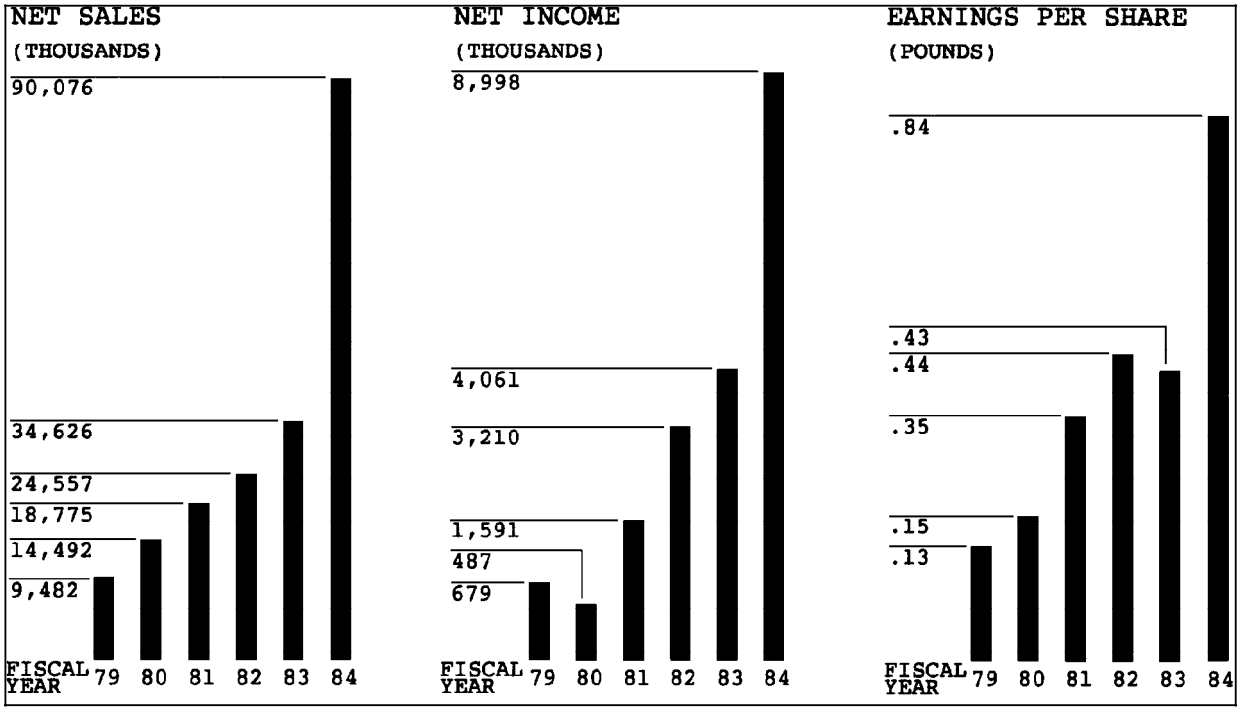
```
&&??@@Y71,1@@Y71,2@@Y75,5B,0D0A@
&&??@@Y73,2@=UDK=**+X$
@Y36,1@=UDK=*$
 *+1Titan10M-P$
 *+2Titan12M-P$
 *1*m700,10,10,10,690$
 *a187,2270$
 *1NET SALES*rr520,NET INCOME*rr480,EARNINGS
PER SHARE$
 *a187,2210$
*2(THOUSANDS)*rr515,(THOUSANDS)*rr505,(POUNDS)$
*x187,2174,562,2$
 *x974,2184,553,2$
 *x1762,2104,562,2$
 *x187,1556,478,2$
*x974,1649,469,2$
```

```
*x1762,1725,499,2$
*x187,1462,394,2$
*x974,1545,384,2$
*x1762,1677,394,2$
*x187,1406,300,2$
*x974,1377,300,2$
*x1762,1566,309,2$
*x187,1341,225,2$
*x974,1322,236,2$
*x1762,1386,225,2$
*x187,1270,141,2$
*x974,1265,131,2$
*x1762,1330,141,2$
*y337,1125,150,37$
*y421,1125,216,37$
*y506,1125,281,37$
*y590,1125,337,37$
*y674,1125,431,37$
*y759,1125,1050,37$
*y1115,1125,141,37$
*y1199,1125,103,37$
*y1209,1237,86,2$
*y1284,1125,253,37$
*y1368,1125,422,37$
*y1453,1125,525,37$
*y1537,1125,1059,37$
*y1912,1125,206,37$
*y1996,1125,262,37$
*y2081,1125,441,37$
*y2165,1125,553,37$
*y2249,1125,525,37$
*y2334,1125,984,37$
*y2259,1659,66,2$
*a187,2143$
*2
90,076$
*a187,1525$
34,626$
*a187,1431$
24,557$
*a187,1375$
```

```
18,775$
*a187,1310$
14,492$
*a187,1239$
9,482$
*a974,2153$
8,998$
*a974,1618$
4,061$
*a974,1514$
3,210$
*a974,1346$
1,591$
*a974,1291$
487$
*a974,1234$
679$
*a1762,2073$
.84$
*a1762,1694$
.43$
*a1762,1646$
.44$
*a1762,1535$
.35$
*a1762,1355$
.15$
*a1762,1299$
.13$
*a180,1097$
FISCAL$
*a180,1067$
YEAR$
*a337,1082$
79
*a421,1082$
80
*a506,1082$
81
*a590,1082$
82
*a674,1082$
83
```

```
*a759,1082$
 84
 *a955,1097$
 FISCAL$
 *a955,1067$
 YEAR$
 *a1115,1082$
 79
 *a1199,1082$
 80
 *a1284,1082$
 81
 *a1368,1082$
 82
 *a1453,1082$
 83
 *a1537,1082$
 84
 *a1755,1097$
 FISCAL$
 *a1755,1067$
 YEAR$
 *a1912,1082$
 79
 *a1996,1082$
 80
 *a2081,1082$
 81
 *a2165,1082$
 82
 *a2249,1082$
 83
 *a2334,1082$
 84*+X$
@Y36,0@@Y73,1@&&??
```

Figure 4-4. **Sample 3—Bar chart**



Sample 4—Merged form

Sample 4 shows a merged form produced using the XES commands within FSEDIT on an IBM system which uses the Multinational language mapping with a U.S. keyboard.

Caution: When combining IBM printer and XES commands, particularly the reset command, E+XL, (carriage return and line feed) and those that move the current print position, always be aware of the new print position. Failure to consider this may give unexpected results, especially as the reset command resets the printer to the system defaults, including fonts and margins.

The first file is sent to create and modify translate table 8 such that the $ is recognised as a L (carriage return and line feed) and the ! becomes a horizontal tab.

```
&&??@ @Y71,8@@Y75,5B,0D0A:4F,09@
```

The second file, which contains all the XES commands to create the constant page, is preceded by the IBM customer translation table and filter mode commands.

Note: Unexpected results may occur unless Full Feature is selected under Special Features.

```
&&??@@Y36,1@=UDK=**+X@0D@0A @Y73,8@
 =UDK=**+M$
 *+1BoldPSM-L$
 *1*m700,10,10,10,690$
 *a330,460$
 SUNDAY$
 *a330,860$
 MONDAY$
 *a330,1245$
 TUESDAY$
 *a330,1610$
 WEDNESDAY$
 *a330,2020$
 THURSDAY$
 *a330,2465$
 FRIDAY$
 *a330,2825$
```

```
SATURDAY$
*x400,350,2000,12$
*x400,750,2000,12$
*x400,1150,2000,12$
*x400,1550,2000,12$
*x400,1950,2000,12$
*x400,2350,2000,12$
*x400,2750,2000,12$
*x400,3150,2012,12$
*y300,350,2800,12$
*y400,350,2800,12$
*y800,350,2800,12$
*y1200,350,2800,12$
*y1600,350,2800,12$
*y2000,350,2800,12$
*y2400,350,2812,12$
*+P$
```

Figure 4-5. **Sample 4a—Constant page**

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY

The third file contains the data to be merged with the constant page.

```
=UDK=*$
 *ze*+2Times24i6-L$
 *2*m700,10,10,10,690$
 *d*t75,155,235,315,395,475,555$
 *rd100,*2August 1991*q$
 *rd140,*1!!!!!1!2!3$
 *rd352,!4!5!6!7!8!9!10$
 *rd352,!11!12!13!14!15!16!17$
 *rd352,!18!19!20!21!22!23!24$
 *rd352,!25!26!27!28!29!30!31$
 *+P$
```

Figure 4-6. **Sample 4b—Variable data**

AUGUST 1991

				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

The fourth file terminates the constant page, resets the printer, and ends the filter mode.

```
=UDK=* *+V$
 *+X$
 @Y36,0@&&??
```

Figure 4-7. **Sample 4c—Complete form**

AUGUST 1991

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

5. Fonts and character sets

This section describes font support and the relationships between IBM and Xerox fonts.

The ability to install customised translate tables and cross reference tables between IBM and Xerox fonts provides the user with an exceptional degree of flexibility and considerable scope for designing fonts to suit individual requirements, not specifically addressed by this design.

Tables showing the Xerox ISO6937, OCR, and APL character sets and the supported IBM code pages are found in Appendix A.

Font support

The font support provided by the Xerox Coax/Twinax Option (XCTO) far exceeds the font capabilities of most of the printers it emulates. Support is provided for three categories of fonts:

- **Fixed pitch fonts**
  XCTO supports fixed pitch fonts matching the fixed pitch capabilities of all the IBM printers emulated.
- **Proportionally spaced fonts**
  XCTO provides support for proportionally-spaced fonts using the same PS width values as those used by IBM, thus ensuring a perfect match with IBM PS fonts even when justification is in use.
- **Typographic fonts**
  As the characters in typographic fonts have variable widths, justification, underscoring, and overstriking may not appear as intended.

Fonts included

The fonts listed are included as part of XCTO as the extended ISO6937 character set (includes Pesetas, Florin, and double underscore) in both portrait and landscape. In addition, Xerox provides an APL and OCR character set.

The fonts available are listed below in relationship to their character sets.

ISO6937

Titan10M	Titan20M
Titan12M	Titan27M
Titan15M	BoldPSM
Titan17M	

OCR	**APL**
OCRA10M	APL10
apl	

The character sets supported by these fonts are found in Appendix A.

Note: Font Titan17M is equal to 16.67 characters per inch. The value of 16.67 is used when calculating orientation.

IBM font selection

In order to provide automatic font selection within the XCTO, IBM font parameters must correlate to Xerox fonts. This correlation must take into account the two methods IBM has of selecting fonts:

Note: The APL font resident in the Coax/Twinax option is slightly different than the APL character set on IBM printers. The IBM font must be licensed from IBM if it is required.

SCS mode

In SCS fonts are not referenced directly, but by a very limited set of font attributes. A font is defined by the following attributes:

1. Font type	Normal, APL, OCR
2. Pitch	10, 12, 15, 17, PS
3. Orientation	Portrait, Landscape, COR

Note: COR (Computer Output Reduction) is regarded as a separate orientation.

An SCS command, such as the Set Character Density (SCD) command, which changes any of these parameters, causes a font switch.

DCA mode

In DCA a more elaborate mechanism for selecting fonts exists where a font may be selected by a GFID (**G**lobal **F**ont **ID**entifier) number from 0 to 65535. Each number refers uniquely to an IBM font which is the same for all printers.

Global Font Identifiers (GFIDs)

GFIDs are numbers that reference fonts in the IBM data stream. A Xerox font may be identified by an associated GFID. (Table 5-1 shows the default GFIDs that are associated with Xerox fonts resident in the 4213 and the XCTO cartridge.)

A GFID defines the typestyle, font type and the pitch but not the orientation. For example, GFID 11 refers to a Courier 10 pitch font in *both* portrait and landscape orientations. The font orientation on the printed page is taken from the orientation associated with the paper tray unless auto orientation is enabled.

Table 5-1 provides a cross reference between the IBM GFID number and a Xerox font name. The following table shows the XCTO's default settings and how these settings relate to IBM font names. The user can add or replace entries in this default table, to suit user requirements, using the XCTO GFID assignment command (refer to chapter 3 for details). The table is printed on the XCTO configuration sheet under “Font Information.” This does not mean that the font is present in the printer; the GFID assignment is merely a number associated with the font name.

Table 5-1. **IBM GFID and Xerox font cross reference**

IBM GFID No	Xerox font name	IBM name
11	Titan10M	Courier 10
19	OCRA10M	OCRA
45	APL10apl	APL10
85	Titan12M	Courier 12
159	BoldPSM	Boldface
204	XCP14iso	Gothic Text 13
223	Titan15M	Courier 15
252	Titan17M	Courier 17
281	Titan20M	Gothic Text 20
290	Titan27M	Gothic Text 27

Notes: The Xerox font name does not include the orientation suffix. This is appended -P for portrait or -L for landscape, depending upon the page orientation when the GFID is selected.

If there is no entry corresponding to a particular GFID, no font switch is made, and an IBM TYPE 2 error report occurs.

GFIDS do not apply to the 4045-20 mode.

GFID assignment in the text file

The Special Features option on the printer control panel under “Coax Config’ or “Twinax Config” enables users to explicitly assign GFIDs to Xerox fonts by entering a text string in the print file. This feature works in a manner similar to the font ID assignment available under XES.

Example Assign GFID number 85 to Elite12iso-P and Elite12iso-L (instead of the default font Titan12M):

1. Select “Full Feature” option under “Special Features” on the Coax/Twinax control panel.

2. Assign the interface escape character to the “at sign” (@) by entering the following bold strings in a text file:

   &&??@

3. Assign GFID number 85 to Elite12iso-P and Elite12iso-L.

   @Y97,85,Elite12iso@

4. To save the GFID assignment across a power off/on, enter:

   @X1

   The “1” specifies a save of all software set up commands *except* the interface escape character. Replace the “1” with a “2” to save the interface escape character *as well*.

5. Send the text file to the printer.

6. De-select the “Full Feature” option.

Note: Factory default GFID settings cannot be deleted, but a previous GFID assignment can be deleted (or reset to the factory default if it is a default GFID number) by assigning a GFID *without* a font name. For example,

@Y97,85@

returns the Xerox fontname associated with IBM GFID number 85 to the factory default Titan12M.

When printing in COR the printer automatically reduces the font size. In DCA this means changing the GFID number. It also means that the IBM printer must make an assumption about the pitch of the GFID from which it is changing and the pitch of the GFID to which it is changing. GFID numbers should be assigned using the ranges in Table 5-2.

Table 5-2. **DCA GFID to XCTO**

Pitch	GFID range
5 pitch	244 - 245
10 pitch	1 - 65
12 pitch	66 - 154
PS pitch	155 - 203
14 pitch	204
15 pitch	205 - 230
17 pitch	252 - 254
20 pitch	280 - 281
27 pitch	290 - 292

In the Twinax environment, there are 2 methods to select GFIDs in the text file.

Example GFIDs can be selected with the **Set FID Through GFID (SFG)** DCA command from the host. (Refer to page 2-55 for more information on the command parameters.)

The command format is:

2B D1 07 05 gfgf fwfw fa

The **gfgf** parameter specifies the GFID, which determines the pitch of the font to be used. **fwfw** specifies the font width, but it is *not* used. A mismatch between **gfgf** and **fwfw** may cause data loss or other unexpected results. **fa** specifies fixed pitch or proportional spacing.

2B D1 07 05 000B 0090 01

000B, the gfgf field in the above command, specifies a GFID of 11. If the factory defaults have not been changed, Titan10M is selected.

XCTO font selection

XCTO combines the font selection process for SCS and DCA which allows you to customise the Xerox fonts which are automatically selected when font parameters are changed through the data stream. This is achieved by a two stage process which is described below.

Stage 1: SCS font attribute to GFID table:

Stage 1 assigns a GFID number for every font attribute combination as shown in table 5-3. These are not unique font identifiers as orientation has not yet been specified.

Table 5-3. **SCS font to GFID table**

Font type	Pitch	Portrait	Landscape	COR
Normal	10	11	11	204
Normal	12	85	85	223
Normal	15	223	223	281
Normal	17	252	252	290
Normal	PS	159	159	223
APL	10	45	45	88
APL	12	88	88	235
APL	15	235	235	280
APL	17	255	255	291
OCRA	10	19	19	89
OCRA	12	89	89	236
OCRA	15	236	236	282
OCRA	17	256	256	292

Stage 2: GFID to Xerox font cross reference

Stage 2 is a simple cross-reference table which links each GFID to a Xerox fontroot name, as shown in table 5-1. (A fontroot name is the font name without the orientation suffix.)

Example

The Twinax Interface can also select a font with the appropriate pitch by cross-referencing the assigned GFID with the specified pitch in the **Set Character Density (SCD)** command. (Refer to page 2-50 for more information on the command parameters.)

The command format is:

2B D2 04 29 00 cp

The **cp** parameter specifies the number of characters to be printed per horizontal inch (CPI).

2BD2 04 29 00 0A

0A, the cp parameter in the above command, specifies a pitch of 10 CPI. (stage 1, see table 5-3)

For stage 2, the GFID 11 matches to Xerox font Titan 10M (see table 5-1).

Character sets

When operating in the ISO6937 mode the default XCTO character set is defined at power up by the user defined default selection stored in nonvolatile memory (NVRAM). This can be changed by SCS/DCA data stream commands which select the character set by either a language identifier (in SCGL command) or a Code Page Global Identifier (CPGID, in SCG command). They can also be selected by special feature translation table commands. Up to 8 customised tables can be downloaded and stored in nonvolatile memory (NVRAM).

Table 5-4 shows the IBM code pages/character sets supported and the corresponding language identifier:

Table 5-4. **IBM code pages/character sets**

Character set ID (SCGL)	Code Page (CPGID)	Language ID*	Language
X'01'	037	01	English (U.S.)
X'02'	273	03 or 13	Austrian/German
X'03'	274	04	Belgian
X'04'	275	05	Brazilian
X'05'	276	06	French Canadian
X'06'	277	07 or 08	Danish/Norwegian
X'07'	278	09 or 10	Finnish/Swedish
X'09'	280	15	Italian
X'0A'	281	16	Japanese (Latin characters)
X'0C'	282	28	Portuguese
X'0D', X'0E', X'0F'	284	19, 20, 21	Spanish/Spanish speaking
X'0F'	285	22	English (UK)
X'08'	297	11 or 30	French
-	310	-	APL (co-ax only)
X'00'	500	14	Multinational
-	892	41	OCRA

*(as for *Y8,n* refer to chapter 3)

Graphic character sets

In addition to code page definition, IBM defines a subset of printable characters within a nationalised code page, by specifying a Graphic Character Set Global Identifier (CGSGID). On an IBM band or daisywheel printer, any character which does not appear within the subset of the code page, defined by the CGSGID is substituted with the error character (hyphen). This is due to the physical limitations of these types of printers and is not appropriate for a laser printer, where all characters are always available. Therefore, the XCTO design ignores CGSGID assignments and allows all characters within the code page to be accessed regardless of the CGSGID assignment.

Code page definitions for the ISO6937 mode are found in Appendix A.

6. Error handling

The Xerox Coax/Twinax Option (XCTO) supports IBM error types and IBM error code actions as well as reporting XES formatting errors and initialisation errors. XCTO recognises the following error categories:

- IBM datastream error type1
- IBM datastream error type2
- IBM datastream error type3 or invalid SCS parameter
- IBM datastream error type4 or invalid SCS command
- XES formatting error
- Initialisation error.

Errors are logged internally by XCTO as well as being passed to the target printer. This allows the target printer to include XCTO errors on the normal printer status sheet which is printed at the end of a job. However, it is up to the target printer, not XCTO, to include this data in the status sheet if required. Table 6-1 shows the various error codes which are reported and their meanings.

IBM error types

In addition to being reported to the target printer, IBM error types are reported back to the host through the coax/twinax protocols.

IBM error types fall into the four categories described below. For each error category an error action may be defined by the user via an IBM datastream command.

Table 6-1. **Error code descriptions**

Error type	Description
1	Detection of a condition that can cause loss of text information
2	Condition detected that can alter the appearance of the printed output
3	A multibyte command detected that contains an unsupported type or class code
4	A multibyte command detected that contains an unsupported parameter or parameter value

SCS parameter and command errors are reported through both coax and twinax protocols.

Note 1: Though IBM errors are reported, under certain conditions they may not match the errors reported by the emulated printers.

Note 2: The 4045 Model 20 emulation does not report errors to the IBM host.

Note 3: For short documents, a print complete is returned to the host before the document has been printed. If paper jams or paper outages occur under these specific conditions, they are not reported to the IBM host.

7. Configuration and sysgen samples

This chapter provides you with examples of possible configurations for your Xerox printing system to function on the IBM host.

The chapter is divided into two parts: the first looks at the coax environment, the second at the twinax environment.

Coax printers

Four of the possible line configurations are shown in this section. They are followed by sample sysgen programmes.

Line configurations

XCTO supports two types of coax environments, SCS in SNA/SDLC and DSC in non-SNA. The next four illustrations show possible configurations for both environments using IBM 3174/3274/3276 attachments.

- Configuration 1 shows only an IBM 3287.
- Configuration 2 shows the Xerox printer replacing the IBM 3287 on the same port.
- Configuration 3 shows a Xerox printer attached to a previously unused port and the IBM 3287 attached to its previous port.
- Configuration 4 shows a Xerox printer attached to a previously unused port, a second Xerox printer attached to a previously unused port through a communications module, and the IBM 3287 attached to its previous port.

Figure 7-1. **Configuration 1**

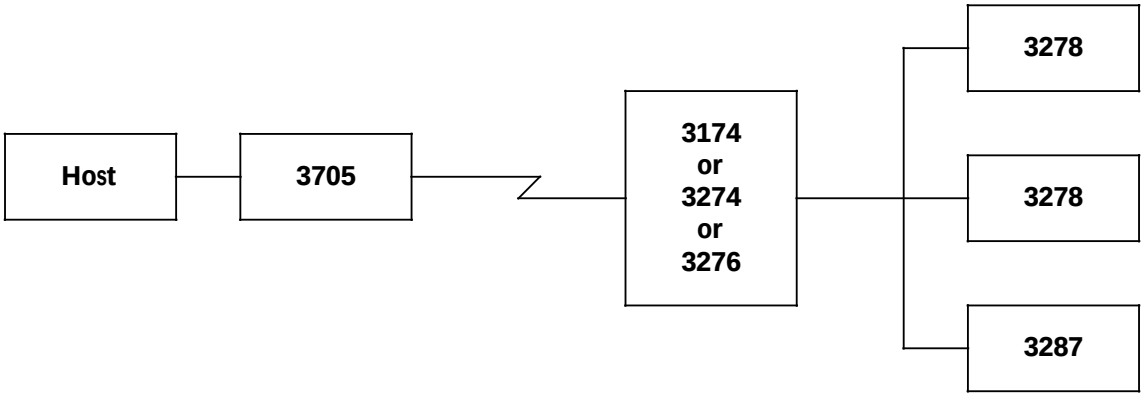


Figure 7-2. **Configuration 2**

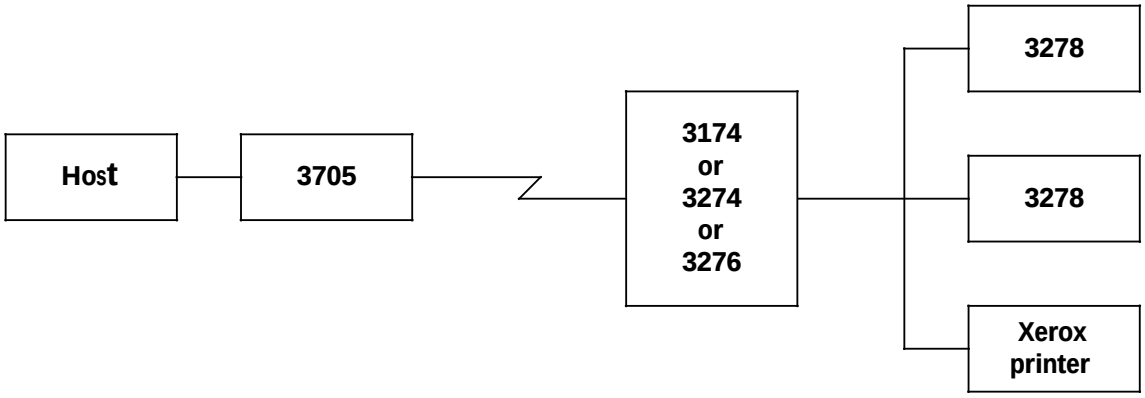


Figure 7-3. **Configuration 3**

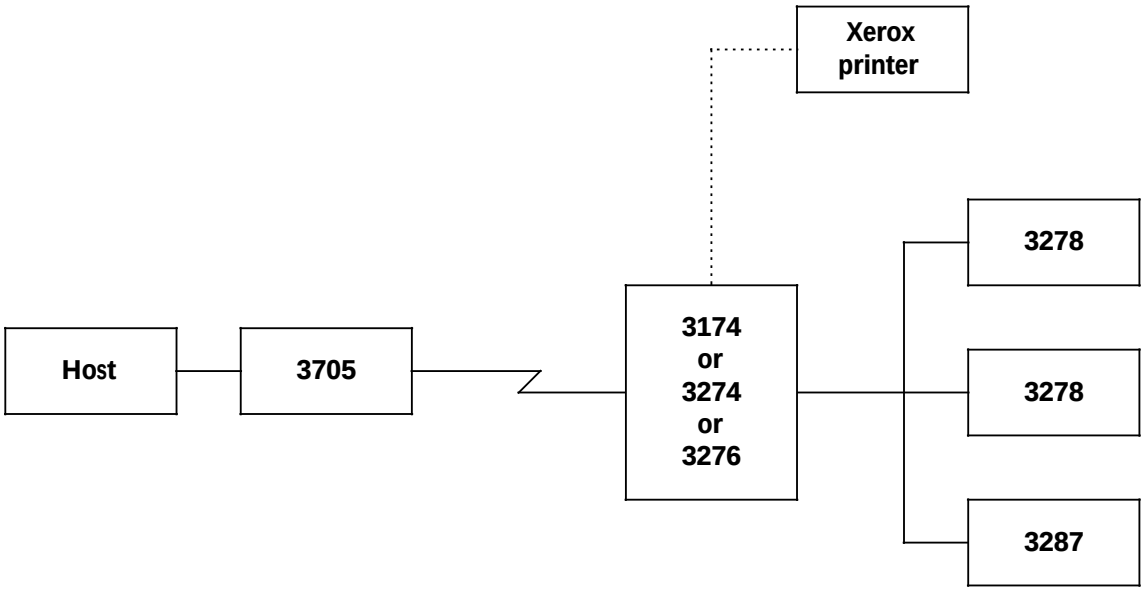
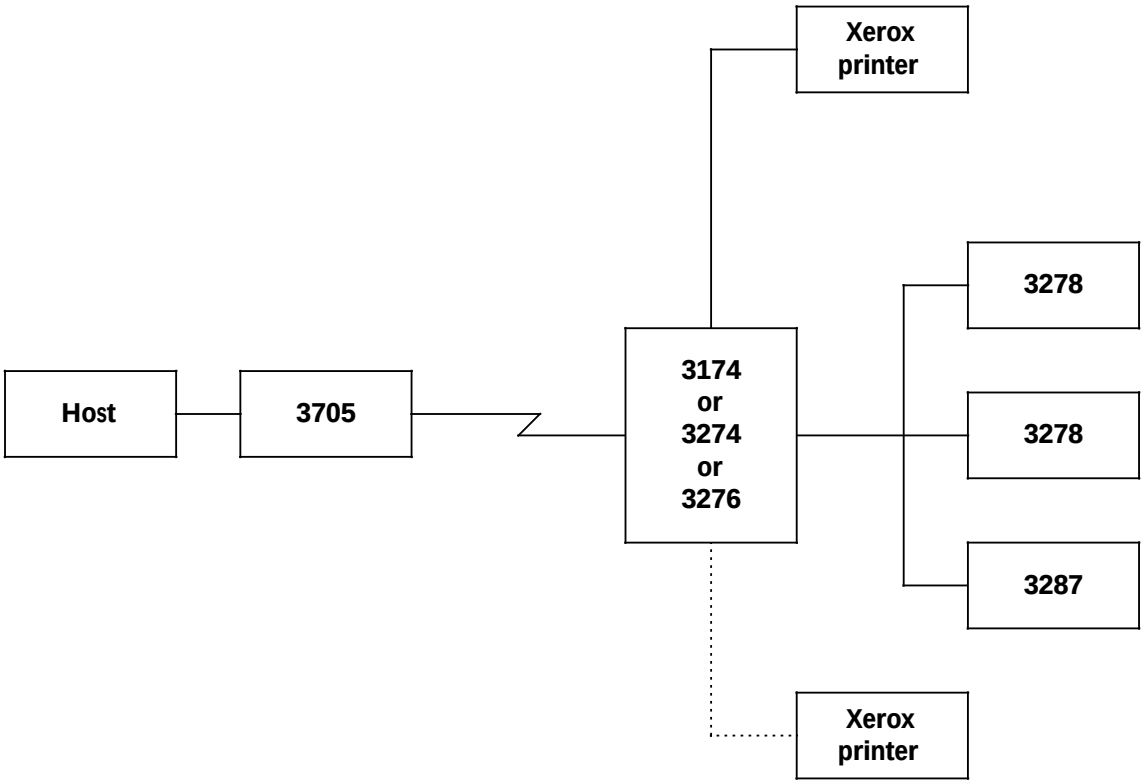


Figure 7-4. **Configuration 4**



Sysgen samples

The following examples represent parameters to enter when using IBM copyright programmes to perform:

- Sample IO Gen for the 3274—non-SNA controller
- Sample VTAM parameter for local non-SNA 3270 terminal and printer
- Sample VTAM parameter for local SNA 3270 terminal and printer

- Sample NCP Gen—Group, Line, PU and LU Definition
- Sample NCP Gen—Group, Line, PU and LU Definition—3276C
- Sample mode table entries for 3278-2 terminals (by control unit type)
- Sample mode table entries for 3278 printers all control units
- JES/328X Print Facility parameters.

Sample IO Gen for the 3174/3274—non-SNA controller

```
DEVO20     IODEVICE UNIT=3287,ADDRESS=020,MODEL=2,
                          FEATURE=(DOCHAR,EBKY3277,KB78KEY,NUMLOCK,AUDALRM)
DEVO21     IODEVICE UNIT=3279,ADDRESS=021,MODEL=2A,
                          FEATURE=(DOCHAR,EBKY3277,KB78KEY,NUMLOCK,AUDALRM)
DEVO22     IODEVICE UNIT=3279,ADDRESS=022,MODEL=2A,
                          FEATURE=(DOCHAR,EBKY3277,KB78KEY,NUMLOCK,AUDALRM)
```

Sample VTAM parameter for local non-SNA 3270 terminal and printer

```
            LBUILD
*
LP920T00    LOCAL     CUADDR=920,          3278-2 TERMINAL
                      TERM=3277,
                      FEATUR2=(MODEL2),
                      ISTATUS=ACTIVE,
                      USSTAB=USSVTAM,
                      MODETAB=MODE3270,
                      DLOGMOD=S3270
*
LP921P01    LOCAL     CUADDR=921,          3287 PRINTER
                      TERM=3286,
                      FEATUR2=(MODEL2),
                      ISTATUS=ACTIVE,
                      USSTAB=USSVTAM,
                      MODETAB=MODE3270,
                      DLOGMOD=DSC2K
```

Sample VTAM parameter for local SNA 3270 terminal and printer

```
            VBUILD    TYPE=LOCAL
*
X10PUA0D    PU        CUADDR=A0D,
                      MAXBFRU=9,
                      PUTYPE=2,
                      USSTAB=USSVTAM,
                      MODETAB=MODE3270,
                      ISTATUS=ACTIVE
*
LPA0DT00    LOCAL     LOCADDR=2,          3278-2 TERMINAL
                      DLOGMOD=T3278M2,
                      ISTATUS=ACTIVE
*
LPA0DP01    LOCAL     LOCADDR=3,          3287 PRINTER
                      DLOGMOD=DSC2K,
                      ISTATUS=ACTIVE
```

Sample NCP Gen—Group, Line, PU and LU definition—3274-61C

```
SNAGP01     GROUP     LNCTL=SDLC,
                      CLOCKING=EXT,
                      DIAL=NO,
                      DUPLEX=FULL,
                      NEWSYNC=NO,
                      NRZI=NO,
                      REPLYTO=1,
                      RETRIES=(1, 1, 2),
                      TYPE=NCP
*
N05LN039    LINE      ADDRESS=(039),
                      ANS=CONTINUE,
                      DUPLEX=(FULL),
                      ETRATIO=30,
                      PAUSE=,2,
                      SERVLIM=4,
                      SPEED=9600,
                      VPACING=2
```

```
            SPACE 3
SOTL039     SERVICE ORDER=(N05039P0)
            SPACE 3
*
N05039P0    PU        ADDR=C1,
                      DISCNT=(NO),
                      IRETRY=NO,
                      ISTATUS=ACTIVE,
                      MAXDATA=265,
                      MAXOUT=7,
                      MODETAB=MODE3270,
                      PASSLIM=10,
                      PUDR=NO,
                      PUTYPE=2,
                      RETRIES=(, 10, 3),
                      SRT=(32768, 10),
                      SSCPFM=USSSCS,
                      USSTAB=USSVTAM
*
LAX39L00    LU        LOCADDR=2,          3278-2 TERMINAL
                      BATCH=NO,
                      DLOGMOD=M3278M2,
                      ISTATUS=ACTIVE
*
LAX39L01    LU        LOCADDR=3,          3287 PRINTER
                      BATCH=NO,
                      PACING=0,
                      VPACING=0,
                      DLOGMOD=DSC2K,
                      ISTATUS=ACTIVE
```

Sample NCP Gen—Group, Line, PU and LU definition—3276-C

```
SNAGP02      GROUP     LNCTL=SDLC,
                       CLOCKING=EXT,
                       DIAL=NO,
                       DUPLEX=FULL,
                       ISTATUS=ACTIVE,
                       NEWSYNC=NO,
                       NRZI=NO,
                       PAUSE=,2,
                       RETRIES=(7, 1, 3),
                       SSCPFM=USSSCS,
                       SPEED=9600,
                       TYPE=NCP,
                       USSTAB=USSVTAM
*
N05LN03B     LINE      ADDRESS=(3B),
                       SPEED=9600
*
SOTL039      SERVICE ORDER=(N0503BP0)
*
N0503BP0     PU        ADDR=C1,
                       IRETRY=YES,
                       ISTATUS=ACTIVE,
                       MAXDATA=265,
                       MAXOUT=7,
                       PASSLIM=12,
                       PUTYPE=2,
                       MODETAB=MODE3270,
                       SSCPFM=USSSCS,
*
LAX3BL00     LU        LOCADDR=2,           3278-2 TERMINAL
                       DLOGMOD=DT3278M2,
                       ISTATUS=ACTIVE
*
LAX3BL01     LU        LOCADDR=3,           3287 PRINTER
                       DLOGMOD=DSC2K,
                       ISTATUS=ACTIVE
```

Sample mode table entries for 3278-2 terminals (by control unit type)

```
MODE3270     MODETAB
*
             MODEENT LOGMODE=S3270,           LOCAL NON-SNA 3274 CONTROL UNIT
                       FMPROF=X'02',                3278-2 TERMINAL
                       TSPROF=X'02',
                       PRIPROT=X'71',
                       COS=HICOS,
                       SECPROT=X'40',
                       COMFPROT=X'2000',
                       RUSIZES=X'0000',
                       PSERVIC=X'000000000000185018500200'
*
             MODEENT LOGMODE=S3278M2,         LOCAL SNA 3274 CONTROL UNIT
                       FMPROF=X'03',                3278- 2 TERMINAL
                       TSPROF=X'03',
                       PRIPROT=X'B1',
                       SECPROT=X'90',
                       COMPROT=X'3080',
                       RUSIZES=X'87C7',
                       PSERVIC=X'020000000000185018507F00'
*
             MODEENT LOGMODE=S3270,           REMOTE SNA 3274 CONTROL UNIT
                       FMPROF=X'03',                3278 - TERMINAL
                       TSPROF=X'03',
                       PRIPROT=X'B1',
                       SECPROT=X'90',
                       COMPROT=X'3080',
                       RUSIZES=X'88F8',
                       PSERVIC=X'020000000000185000007E00'
```

Sample mode table entries for 3287 printers all control units

```
*
            MODEENT LOGMODE=DSC2K,           3287 PRINTER
                      FMPROF=X'03',
                      TSPROF=X'03',
                      PRIPROT=X'B1',
                      SECPROT=X'90',
                      COMPROT=X'3080',
                      RUSIZES=X'8787',
                      PSERVIC=X'03000000000000185018507F00'
*
            MODEENT LOGMODE=SCS,             SNA CHARACTER STRING PRINTER
                      FMPROF=X'03',
                      TSPROF=X'03',
                      PRIPROT=X'B1',
                      SECPROT=X'90',
                      COMPROT=X'3080',
                      RUSIZES=X'87C6',
                      PSNDPAC=X'01',
                      SRCVPAC=X'01',
                      PSERVIC=X'01000000E100000000000000'
```

JES/328X print facility parameters

```
*
*           'RMT 14 LP921P01' IS A LOCAL, NON-SNA PRINTER
*           'RMT 15 LPA0DP01' IS A LOCAL, SNA PRINTER
*           'RMT 16 LAX39L01' IS A REMOTE, 3274 SNA PRINTER
*           'RMT 17 LAX3BL01' IS A REMOTE, 3276 SNA PRINTER
*
PLU=NJEWC03,
SLU=RMT 14,TLU=LP921P01,LUTYPE=1,LOGMODE=DLOGMOD
PLU=NJEWC03,
SLU=RMT 15,TLU=LPA0DP01,LUTYPE=1,BUFSIZE=1520,LOGMODE=SCS,IMMRESP=N
PLU=NJEWC03,
SLU=RMT 16,TLU=LAX39L01,LUTYPE=1,BUFSIZE=1520,LOGMODE=SCS,IMMRESP=N
PLU=NJEWC03,
SLU=RMT 17,TLU=LAX3BL01,LUTYPE=1,BUFSIZE=1520,LOGMODE=SCS,IMMRESP=N
```

Twinax printers

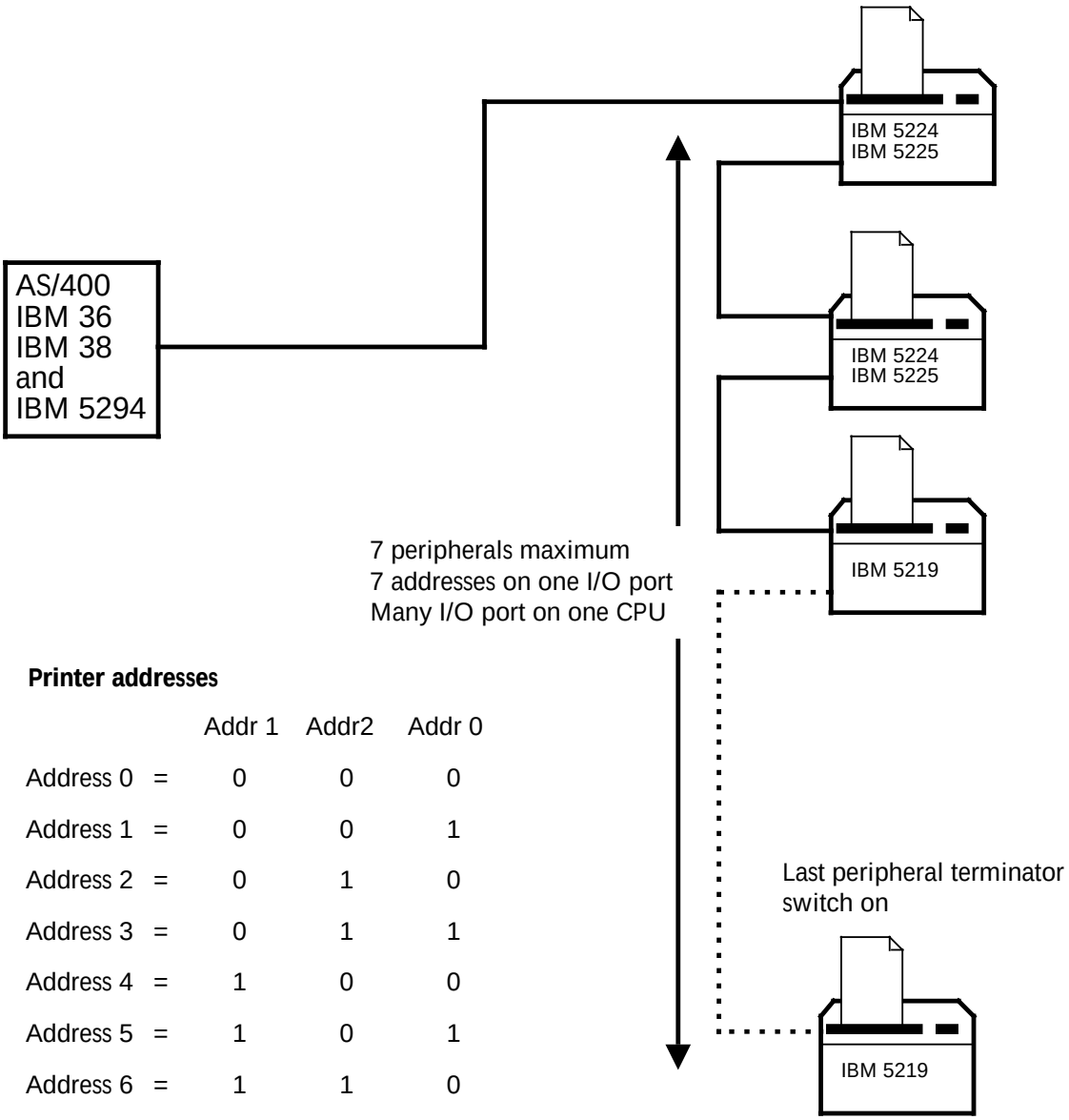
Three of the possible line configurations are shown in this section.

Line configurations

XCTO supports two types of twinax environments, SCS and DCA in word processing. The next three illustrations show possible configurations for both environments using IBM 5224/5225/5256/5219 attachments.

- Configuration 1 shows an IBM 5224, 5225 or 5256 and an IBM 5219. Note that only one of the three printers shown at address 0 and 1 can actually be attached, and the system configuration must reflect this.
- Configuration 2 shows Xerox printers replacing the IBM printers. In this case no change in the IBM system configuration is required as long as the Xerox printer emulates the printer it replaces.
- Configuration 3 shows the Xerox printer operating in the same system as the IBM printers. A Xerox printer has been added to the system, so the IBM host configuration has to be modified to reflect this addition.

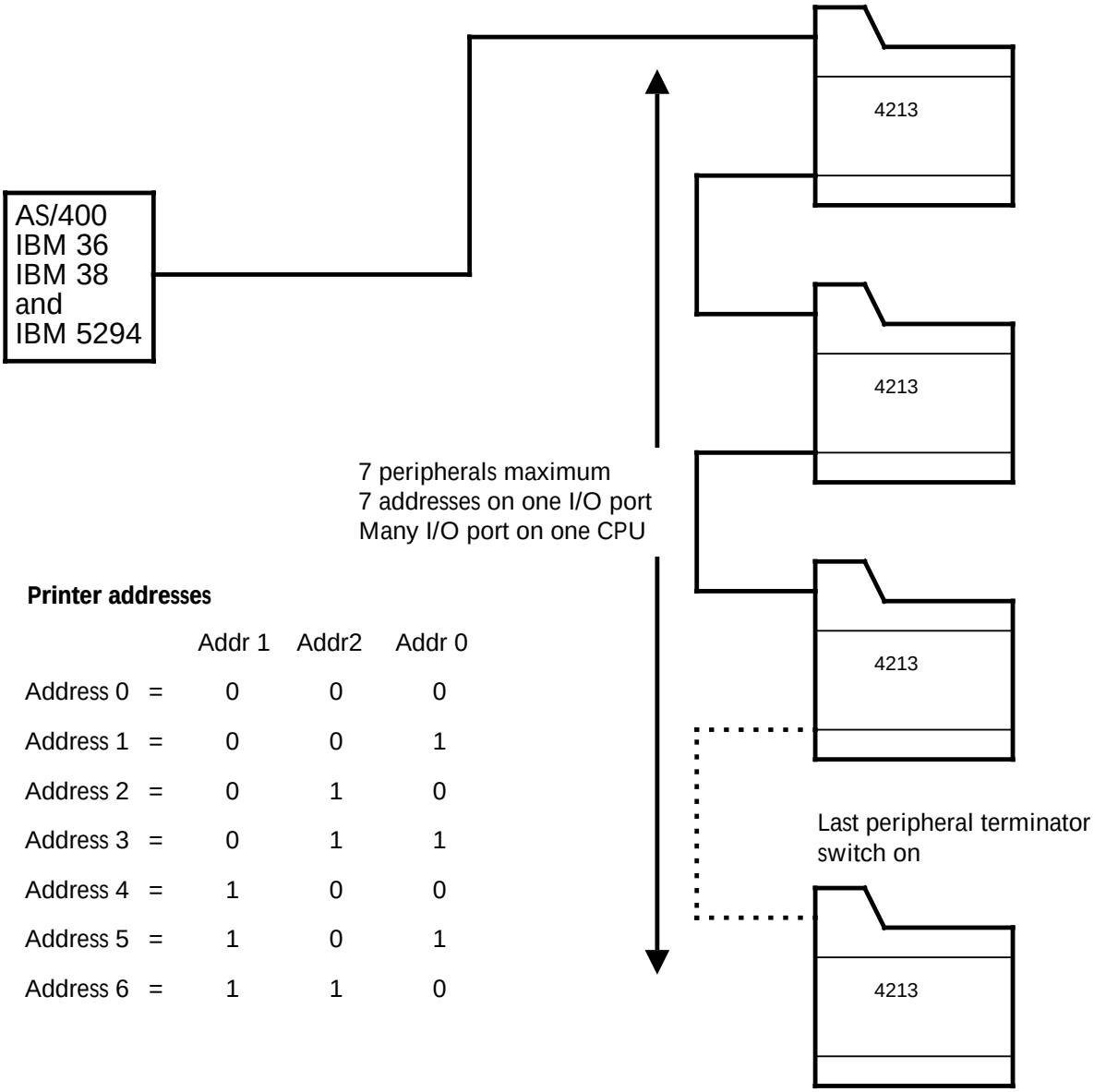
Figure 7-5. **Configuration 1**



Printer addresses

		Addr 1	Addr2	Addr 0
Address 0	=	0	0	0
Address 1	=	0	0	1
Address 2	=	0	1	0
Address 3	=	0	1	1
Address 4	=	1	0	0
Address 5	=	1	0	1
Address 6	=	1	1	0

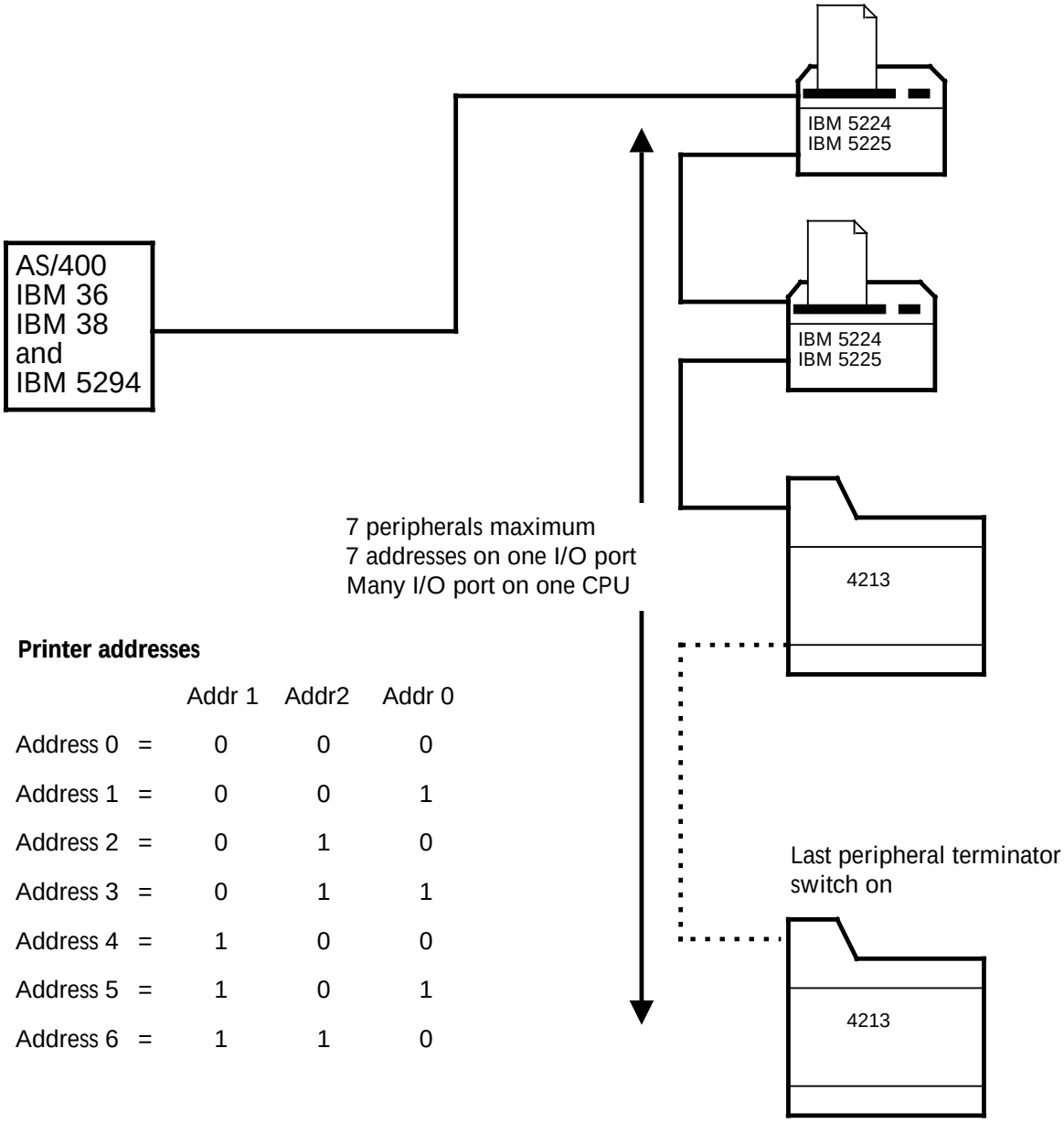
Figure 7-6. **Configuration 2**



Printer addresses

		Addr 1	Addr2	Addr 0
Address 0	=	0	0	0
Address 1	=	0	0	1
Address 2	=	0	1	0
Address 3	=	0	1	1
Address 4	=	1	0	0
Address 5	=	1	0	1
Address 6	=	1	1	0

Figure 7-7. **Configuration 3**



Printer addresses

		Addr 1	Addr2	Addr 0
Address 0	=	0	0	0
Address 1	=	0	0	1
Address 2	=	0	1	0
Address 3	=	0	1	1
Address 4	=	1	0	0
Address 5	=	1	0	1
Address 6	=	1	1	0

A. Font and code set tables

This appendix contains the supported ISO6937, APL, and OCR character sets and the IBM code set tables applicable to XCTO.

The tables provide:

- The Xerox font character assignments for ISO6937, APL, and OCR—tables A-1 to A-3
- The IBM code set tables supported by XCTO when operating in its ISO6937 mode—tables A-4 to A-19
- The APL character assignments supported by the XCTO when operating in its EBCDIC-SNA mode—table A-20.

  Note: The other Xerox EBCDIC-SNA character assignments supported in this mode can be found in the printer documentation.
- The IBM DSC translation table supported by XCTO when operating in its ISO6937 and EBCDIC-DSC modes—table A-21.
- The DSC APL character assignments supported by the XCTO when operating in its ISO6937 mode—table A-22.
- The DSC APL character assignments supported by the XCTO when operating in its EBCDIC-DSC mode—table A-23.
- The IBM DSC to Xerox DSC translation table used by XCTO when operating in its EBCDIC-DSC mode—table A-24.
- The Xerox special translate table for fonts and graphics—table A-25.

The following table shows the ISO6937 extended character set support for the XCTO's Titan 10-27M fonts.

Table A-1. **ISO6937 extended character set**

	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	Sp	0	@	P	`	p				°		-		K
x1	!	1	A	Q	a	q	`		¡	±	`	1	Æ	æ
x2	”	2	B	R	b	r	´		¢	2	´	®	Ð	đ
x3	#	3	C	S	c	s	ˆ		£	3	ˆ	©	ª	ð
x4	$	4	D	T	d	t	˜		$	×	˜	™	Ħ	ħ
x5	%	5	E	U	e	u	¯		¥	µ	¯	♩		ı
x6	&	6	F	V	f	v	˘		#	¶	˘	*f*		
x7	'	7	G	W	g	w	˙		§	•	˙		Ł	ł
x8	(	8	H	X	h	x	¨	¬		÷	¨		Ľ	ľ
x9	)	9	I	Y	i	y	¨	¦	'	'	¨		Ø	ø
xA	*	:	J	Z	j	z	°		”	”	°		Œ	œ
xB	+	;	K	[	k	{	¸		«	»	¸	═	º	ß
xC	,	<	L	\	l	|	_		←		_		þ	Þ
xD	-	=	M	]	m	}	˝		↑		˝		Ŧ	ŧ
xE	.	>	N	^	n	~	˛		→		˛		Ŋ	ŋ
xF	/	?	O	_	o	del	ˇ		↓	¿	ˇ			

Note: XCTO also uses an XCP14 ISO font which does not include the florin (X'D7'), Pesetas (X'DA'), and double underline (X'DB'),

Table A-2. **APL character set**

	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0		0	@	P	`	p			¯	∝	L	V	∈	→
x1	!	1	A	Q	a	q			↑	∈	M	W	≡	□
x2	"	2	B	R	b	r			¢	ι	∪	X	⊢	⊃
x3	#	3	C	S	c	s			A	ρ	Δ	Y	⊣	⊂
x4	$	4	D	T	d	t			B	ω	P	Z	∨	Ö
x5	%	5	E	U	e	u			C	~	Q	◇		○
x6	&	6	F	V	f	v			D	×	R		↓	⍥
x7	'	7	G	W	g	w			E	\	S		≤	←
x8	(	8	H	X	h	x		¬	F	÷	T		⌈	G
x9	)	9	I	Y	i	y		¦	T	⍨	U		⌊	∇
xA	*	:	J	Z	j	z		∧	H	J	⍲		≠	
xB	+	;	K	[	k	{		⍤	I	K	∨		⍱	⍛
xC	,	<	L	\	l	|		⍥	⊥	O	⍬	⍒	⍨	⍋
xD	-	=	M	]	m	}		ι	∩	N	⍉	⍋	⊖	⍟
xE	.	>	N		n	~		⍪	≥	≠	⍁	⍎	⍇	⍕
xF	/	?	O	_	o			!	∘	|	⍉	⍲	⍑	

This table does not provide full support for APL as defined by IBM. If full support is required, you need to acquire the appropriate font and use the XCTO translate table feature to match the characters.

Unsupported characters print as a white plus sign in a black box (reverse video effect).

Table A-3. **OCRA character set**

	2x	**3x**	**4x**	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**	**Cx**	**Dx**	**Ex**	**Fx**
x0	Sp	0	@	P	`	p				—			Å	å
x1	!	1	A	Q	a	q					`		Æ	æ
x2	″	2	B	R	b	r					´		Ä	ä
x3	#	3	C	S	c	s			£		ˆ			
x4	$	4	D	T	d	t			$		˜			
x5	%	5	E	U	e	u			¥					
x6	&	6	F	V	f	v								
x7	'	7	G	W	g	w			§					
x8	(	8	H	X	h	x					¨		Ñ	
x9	)	9	I	Y	i	y					¨		Ø	ø
xA	*	:	J	Z	j	z							Ö	ö
xB	+	;	K	[	k	{					˛			ß
xC	,	<	L	\	l	|				╝				
xD	-	=	M	]	m	}				╜			Ü	ü
xE	.	>	N	^	n	~				┐				
xF	/	?	O	_	o									

Table A-4. **Code Page 037—U.S. English supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	^	{	}	\	0
x1	(RSP)	é	/	É	a	j	~	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	¢	!	¦	:	«	ª	¡	[	–	ı	2	3
xB	.	$	,	#	»	º	¿	]	ô	û	Ô	Û
xC	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	|	¬	?	”	±		®	‗	õ	ÿ	Õ	(EO)

Table A-5. **Code Page 273—Austrian German supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	ä	ü	Ö	0
x1	(RSP)	é	/	É	a	j	ß	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	{	ë	[	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	@	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	~	Ñ	`	i	r	z		I	R	Z	9
xA	Ä	Ü	ö	:	«	ª	¡	¬	–	ı	²	³
xB	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	§	ð	æ	Ð	¯	¦	}	\	]
xD	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	õ	ÿ	Õ	(EO)

Table A-6. **Code Page 274—Belgian supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	é	è	ç	0
x1	(RSP)	{	/	É	a	j	¨	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	@	}	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	\	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	[	]	ù	:	«	ª	¡	¬	–	ı	²	³
xB	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	à	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	~	ò	¦	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	õ	¨y	Õ	(EO)

Table A-7. **Code Page 275—Brazilian supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	õ	é	\	0
x1	(RSP)	}	/	[	a	j	~	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	`	î	@	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	¦	ì	]	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	ã	i	r	z		I	R	Z	9
xA	É	$	ç	:	«	ª	¡	¬	–	ı	2	3
xB	.	Ç	,	Õ	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	Ã	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	{	ÿ	#	(EO)

Table A-8. **Code Page 276—French Canadian supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	é	è	¸	0
x1	(RSP)	{	/	É	a	j	¨	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	[	}	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	à	´	ù	:	«	ª	¡	¬	–	ı	²	³
xB	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	ý	\	Ý	~	ò	¦	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	]	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	õ	ÿ	Õ	(EO)

Table A-9. **Code Page 277—Danish/Norwegian supported by XCTO when operating in its ISO6937 mode**

	4x	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**	**Cx**	**Dx**	**Ex**	**Fx**
x0	(SP)	&	-	¦	@	°	µ	¢	æ	å	\	0
x1	(RSP)	é	/	É	a	j	ü	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	}	ï	$	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	#		ø	:	«	ª	¡	¬	–	ı	2	3
xB	.	Å	,	Æ	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	Ø	ð	{	Ð	¯	ö	~	Ö	Ü
xD	(	)	_	'	ý	¸	Ý	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	[	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±	]	®	‗	õ	ÿ	Õ	(EO)

Table A-10. **Code Page 278—Finnish/Swedish supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	ä	å	É	0
x1	(RSP)	`	/	\	a	j	ü	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	{	ë	#	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	[	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	}	ï	$	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	é	i	r	z		I	R	Z	9
xA	§		ö	:	«	ª	¡	¬	–	ı	2	3
xB	.	Å	,	Ä	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	Ö	ð	æ	Ð	¯	¦	~	@	Ü
xD	(	)	_	'	´y	¸	´Y	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±	]	®	‗	õ	¨y	Õ	(EO)

Table A-11. **Code Page 280—Italian supported by XCTO when operating in its ISO6937 mode**

	4x	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**	**Cx**	**Dx**	**Ex**	**Fx**
x0	(SP)	&	-	ø	Ø	[	µ	¢	à	è	ç	0
x1	(RSP)	]	/	É	a	j	ì	#	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	{	}	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	@	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	\	~	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	ù	i	r	z		I	R	Z	9
xA	°	é	ò	:	«	ª	¡	¬	–	ı	2	3
xB	.	$	,	£	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	§	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	¨	¦	`	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	õ	¨y	Õ	(EO)

Table A-12. **Code Page 281—Japanese (Latin characters) supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	{	}	$	0
x1	(RSP)	é	/	É	a	j	¯	[	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	\	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	£	!	¦	:	«	ª	¡	^	–	ı	2	3
xB	.	¥	,	#	»	º	¿	]	ô	û	Ô	Û
xC	<	*	%	@	ð	æ	Ð	~	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	|	¬	?	”	±		®	¯	õ	¨y	Õ	(EO)

Table A-13. **Code Page 282—Portuguese supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	ã	´	Ç	0
x1	(RSP)	é	/	É	a	j	ç	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	{	î	#	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	~	ì	\	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	[	]	õ	:	«	ª	¡	¬	–	ı	2	3
xB	.	$	,	Ã	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	Õ	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	}	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	¦	¨y	@	(EO)

Table A-14. **Code Page 284—Spanish/Spanish speaking supported by XCTO when operating in its ISO6937 mode**

	4x	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**	**Cx**	**Dx**	**Ex**	**Fx**
x0	(SP)	&	-	ø	Ø	°	µ	¢	{	}	\	0
x1	(RSP)	é	/	É	a	j	¨	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	*ƒ*	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	¦	ß	#	`	i	r	z		I	R	Z	9
xA	[	]	ñ	:	«	ª	¡	^	–	ı	2	3
xB	.	$	,	Ñ	»	º	¿	!	ô	û	Ô	Û
xC	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	ý	¸	Ý	~	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	|	¬	?	”	±		®	═	õ	ÿ	Õ	(EO)

Table A-15. **Code Page 285—U.K. English supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	°	µ	¢	{	}	\	0
x1	(RSP)	é	/	É	a	j	¯	[	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	$	!	¦	:	«	ª	¡	^	–	ı	2	3
xB	.	£	,	#	»	º	¿	]	ô	û	Ô	Û
xC	<	*	%	@	ð	æ	Ð	~	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	|	¬	?	”	±		®	¯	õ	¨y	Õ	(EO)

Table A-16. **Code Page 297—French supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-	ø	Ø	[	`	¢	é	è	ç	0
x1	(RSP)	{	/	É	a	j	¨	#	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	@	}	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	]	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	\	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	µ	i	r	z		I	R	Z	9
xA	°	§	ù	:	«	ª	¡	¬	–	ı	2	3
xB	.	$	,	£	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	à	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	~	ò	¦	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	õ	¨y	Õ	(EO)

Table A-17. **Code Page 310—APL supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)			◊ +	~ +	□	¯	α	{	}	≡	○ +
x1	A	J		∧	| | *	▮ *	∘	∈	(+	) +	1 *	1 +
x2	B	K	S	¨ +	— *	▮ *	— *	⍳	+ +	- +	2 *	2 +
x3	C	L	T	⍰	| *	▬ *	● *	⍴	■ *	┼ *	3 *	3 +
x4	D	M	U	⍳	| *	▬ *	n *	ω	└ *	┘ *		4 +
x5	E	N	V	⍷	| *	▮ *			┌ *	┐ *		5 +
x6	F	O	W	⊢ +				×	├ *	┤ *		6 +
x7	G	P	X	⊣ +				\	┴ *	┬ *		7 +
x8	H	Q	Y	∨				÷	§ *	¶ *		8 +
x9	I	R	Z									9 +
xA					↑	⊃	∩	∇	⍲	⍱	≠	
xB					↓	⊂	∪	∆	⍱	!	⍲	⍱
xC					≤	⍈ *	⊥ +	⊤ +	⍞	⍎	⍕	⍋
xD					⌈	○	[	]	⍉	⍋	⊖	⊗
xE					⌊	± *	≥	≠	⍂	⍐	⍈	⍋
xF					→	←	∘	|	⍜	⍝	⍕	(EO)

* These code points are not supported by the XCTO's APL font and are printed as a white plus sign in a black square (reverse video).

\+ These code points are supported by the XCTO's APL font but are not exactly typographically correct.

Table A-18. **Code Page 500—Multinational supported by XCTO when operating in its ISO6937 mode**

	4x	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**	**Cx**	**Dx**	**Ex**	**Fx**
x0	(SP)	&	-	ø	Ø	°	µ	¢	{	}	\	0
x1	(RSP)	é	/	É	a	j	~	£	A	J	(NSP)	1
x2	â	ê	Â	Ê	b	k	s	¥	B	K	S	2
x3	ä	ë	Ä	Ë	c	l	t	•	C	L	T	3
x4	à	è	À	È	d	m	u	ƒ	D	M	U	4
x5	á	í	Á	Í	e	n	v	§	E	N	V	5
x6	ã	î	Ã	Î	f	o	w	¶	F	O	W	6
x7	å	ï	Å	Ï	g	p	x		G	P	X	7
x8	ç	ì	Ç	Ì	h	q	y		H	Q	Y	8
x9	ñ	ß	Ñ	`	i	r	z		I	R	Z	9
xA	[	]	¦	:	«	ª	¡	¬	–	ı	2	3
xB	.	$	,	#	»	º	¿	|	ô	û	Ô	Û
xC	<	*	%	@	ð	æ	Ð	¯	ö	ü	Ö	Ü
xD	(	)	_	'	´y	¸	´Y	¨	ò	ù	Ò	Ù
xE	+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
xF	!	^	?	”	±		®	‗	õ	¨y	Õ	(EO)

Table A-19. **Code Page 892—OCRA supported by XCTO when operating in its ISO6937 mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0	(SP)	&	-		Ø				{	}	\	0
x1			/		a	j		£	A	J		1
x2					b	k	s	¥	B	K	S	2
x3			Ä		c	l	t		C	L	T	3
x4					d	m	u		D	M	U	4
x5					e	n	v		E	N	V	5
x6					f	o	w		F	O	W	6
x7			Å	_	g	p	x		G	P	X	7
x8					h	q	y		H	Q	Y	8
x9			Ñ		i	r	z		I	R	Z	9
xA	[	]		:								
xB	.	$	,	#								
xC	<	*	%	@							Ö	Ü
xD	(	)		'								
xE	+	;	>	=		Æ						
xF	!		?	″						∧		(EO)

Table A-20. **APL character assignment supported by XCTO when operating in its EBCDIC-SNA mode**

	4x	5x	6x	7x	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
x0		&	-	◊	¨	□	¯	⍺	{	}	\	0
x1	A	J	/	∧	a	j	~	∊	A	J	≡	1
x2	B	K	S	⋄	b	k	s	⍵	B	K	S	2
x3	C	L	T	⍜	c	l	t	⍴	C	L	T	3
x4	D	M	U	⍵	d	m	u	⍵	D	M	U	4
x5	E	N	V	∊	e	n	v		E	N	V	5
x6	F	O	W	⊢	f	o	w	×	F	O	W	6
x7	G	P	X	⊣	g	p	x	\	G	P	X	7
x8	H	Q	Y	∨	h	q	y	÷	H	Q	Y	8
x9	I	R	Z	⍲	i	r	z	¯	I	R	Z	9
xA	¢	!	¦	:	↑	⊃	∩	∇	⍲	⌶	⍱	
xB	.	$	,	#	↓	⊂	∪	∆	⍱	!	⍲	⍫
xC	<	*	%	@	≤	⍥	⊥	⊤	⍞	⍫	⋄	⍙
xD	(	)	_	'	⌈	○	[	]	⌽	⍋	⊖	⍟
xE	+	;	>	=	⌊	⍤	≥	≠	⍉	⍒	⍈	⍎
xF	|	¬	?	"	→	←	∘	|	⍬	⍲	⍕	

Note: Code points/characters not supported by the XCTO's APL font print as a white plus sign in a black box (reverse video effect).

Table A-22. **DSC code page supported by the XCTO when operating in its ISO6937 and EBCDIC-DSC modes**

	0x	**1x**	**2x**	**3x**	**4x**	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**
x0	NUL	(SP)	0	&	à	ä	À	Ä	a	q	A	Q
x1	EM	=	1	¯	è	ë	È	Ë	b	r	B	R
x2	FF	'	2	.	ì	ï	Ì	Ï	c	s	C	S
x3	NL	”	3	,	ò	ö	Ò	Ö	d	t	D	T
x4	STP	/	4	:	ù	ü	Ù	Ü	e	u	E	U
x5	CR	\	5	+	ã	â	Ã	Â	f	v	F	V
x6		|	6	¬	õ	ê	Õ	Ê	g	w	G	W
x7		¦	7	_	¨ y	î	Y	Î	h	x	H	X
x8	<	?	8	.	à	ô	A	Ô	i	y	I	Y
x9	>	!	9	ˇ	è	û	E	Û	j	z	J	Z
xA	[	$	ß	^	é	á	E	Á	k	æ	K	Æ
xB	]	¢	§	~	ì	é	I	É	l	ø	L	Ø
xC	)	£	#	¨	ò	í	O	Í	m	å	M	Å
xD	(	¥	@	´	ù	ó	U	Ó	n	ç	N	Ç
xE	}	Pts	%	`	ü	ú	Y	Ú	o	¯ ;	O	;
xF	{		_	¸	ç	ñ	C	Ñ	p	¯ *	P	*

Note: Code point X‘75‘ print as a Ä when operating in the EBCDIC-DSC mode

Table A-23. **DSC APL character assignment supported by the XCTO when operating in its ISO6937 mode**

	0x	1x	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx
x0			-		-	≥	}	{	Δ	0	-	-
x1		-	-	-	↑	∘	A	J	°	1		-
x2		-	-		≤	⍺	B	K	S	2	↓	I
x3		-	-		⌈	∊	C	L	T	3	¨	!
x4		-	-		⌊	⍳	D	M	U	4	⊖	-
x5		-	-		→	⍴	E	N	V	5	⌹	-
x6		-	-		⎕	⍵	F	O	W	6	⍒	⍋
x7		-	-		⊃	×	G	P	X	7	⍟	⍎
x8	-	-	-		⊂	\	H	Q	Y	8	⍕	
x9	-	-	-		○	÷	I	R	Z	9	⍱	-
xA	-	-	-		←	∇					⍲	⍞
xB	-	-	-	-	-	∆	-				⍱	⍝
xC	-	-	-		∩	⊤	)				∧	
xD	-	-	-	-	∪	]	(	)			∨	~
xE	-	-	-	-	⊥	≠	+			;	⍬	⍲
xF	-	-	-	-	[	|				*	⍉	⍱

Note: Unsupported characters print as a white plus sign in a black box (reverse video effect).

Table A-24. **APL character assignment supported by the XCTO when operating in its EBCDIC-DSC**

	0x	1x	2x	3x	4x	5x	6x	7x	8x	9x	Ax	Bx
x0			0	&	P	∊	⍥	\	a	q	A	Q
x1		=	1	-	Q	⊢	←	÷	b	r	B	R
x2		'	2	.	R	⊣	¯	⍨	c	s	C	S
x3		"	3	,	S	∨	∩	∇	d	t	D	T
x4		/	4	:	T	~	∪	∆	e	u	E	U
x5		\	5	+	U	↑	⊥	⊤	f	v	F	V
x6		|	6	¬	V	↓	A	B	g	w	G	W
x7		¦	7	I	W	≤	Y	≠	h	x	H	X
x8	>	?	8	J	X	⌈	∘	|	i	y	I	Y
x9	<	!	9	K	Y	⌊	∝	⍲	j	z	J	Z
xA	[	$	G	L	Z	→	∊	⍱	k	≡	K	
xB	]	¢	H	¨	⋄	⎕	⍳	⌷	l	≠	L	⍒
xC	(	C	#	M	S	⊃	⍴	⌽	m	⍲	M	⍋
xD	)	D	@	`	T	⊂	⍵	⍉	n	⍞	N	⍟
xE	}	E	%	N	~	⍥		!	o	⍕	O	;
xF	{	F	_	O	⍎	○	×	⍒	p	⍋	P	*

Note: Unsupported characters print as a white plus sign in a black box (reverse video effect).

Table A-25. **IBM DSC to Xerox DSC translate table used when the XCTO is operating in its EBCDIC-DSC mode**

	0x	**1x**	**2x**	**3x**	**4x**	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**
x0	40	40	F0	50	57	75	9E	B7	81	98	C1	D8
x1	40	7E	F1	60	58	76	9F	B8	82	99	C2	D9
x2	0C	7D	F2	4B	59	77	A0	B9	83	A2	C3	E2
x3	15	7F	F3	6B	62	78	AA	BA	84	A3	C4	E3
x4	40	61	F4	7A	63	80	AB	BB	85	A4	C5	E4
x5	0D	E0	F5	4E	64	8A	AC	BC	86	A5	C6	E5
x6	40	4F	F6	5F	65	8B	41	42	87	A6	C7	E6
x7	40	6A	F7	49	66	8C	E8	BE	88	A7	C8	E7
x8	6E	6F	F8	51	67	8D	AF	BF	89	A8	C9	E8
x9	4C	5A	F9	52	68	8E	B0	CA	91	A9	D1	E9
xA	AD	5B	47	53	69	8F	B1	CB	92	E1	D2	FA
xB	BD	4A	48	A1	70	90	B2	CC	93	EA	D3	FB
xC	5D	43	7B	54	62	9A	B3	CD	94	EB	D4	FC
xD	4D	44	7C	79	63	9B	B4	DF	95	83	D5	FD
xE	D0	45	6C	61	80	9C	B5	DB	96	EF	D6	5E
xF	C0	46	6D	56	83	9D	B6	DC	97	5C	D7	5C

Table A-26. **Special font/graphic translate table**

	4x	**5x**	**6x**	**7x**	**8x**	**9x**	**Ax**	**Bx**	**Cx**	**Dx**	**Ex**	**Fx**
x0	00	31										3F
x1			33		61	6A			41	4A		40
x2					62	6B	73		42	4B	53	5B
x3					63	6C	74		43	4C	54	5C
x4					64	6D	75		44	4D	55	5D
x5					65	6E	76		45	4E	56	5E
x6					66	6F	77		46	4F	57	5F
x7					67	70	78		47	50	58	60
x8					68	71	79		48	51	59	7B
x9					69	72	7A		49	52	5A	7C
xA				38								
xB	30		34									
xC			35									
xD	39	32	36									
xE	7D			7E								
xF			37									

B. DSC option defaults

This appendix contains a table showing the default DSC options for the IBM printer emulated and also for the XCTO.

For full details of these commands, refer to chapter 2, “Data stream commands.”

Manuals used to provide this information were:

- *IBM 3262 Printer Models 3413 Component Description*
- *IBM 3268 Printer Models 2 & 2c Description*
- *IBM 3816 Page Printer Setup Instructions*
- *IBM 4245 Printer, Models D12 and D20 Information Manual*
- *IBM 6262 Printer, Models D12 and D14, Product Description*
- *Xerox 4045 Laser CP Model 120 User and Reference Manual*

Table B-1. **IBM printer DSC option defaults**

DSC option	3287 default setting	3262 default setting	3268 default setting	3812/16 default setting	4245 default setting	6262 default setting	4045 Model 20 default setting	XCTO default setting
CR @ MPP + 1					personalised			
First Print Position next line	*		*	*	on			
First Print Position, current line		*			shipment	*	*	*
NL @ MPP +1					personalised			
First Print Position next line		*			on	*	*	*
First Print Position + 2 lines	*		*	*	shipment			
FF WITHIN A PRINT BUFFER					personalised			
2nd Print Position, first line (next	*	*	*	*	on	*	*	*
1st Print Position, first line form)					shipment			
FF @ END OF PRINT BUFFER					personalised			
First Print Position, Line 2 (next	*		*	*	on			
First Print Position, Line 1 form)		*			shipment	*	*	*
NULL SUPPRESSION					personalised			
Suppression of NULL lines	*	*	*	*	on	*		*
Print NULLs as spaces					shipment	(chars)	*	
'FF' VALID					personalised			
At Print Position 1 and MPP+1	*	*	*	*	on	*	*1	*
Whenever encountered					shipment			
AUTO FF @ END OF PRINT BUFFER					personalised			
Print Position 1 next line	*	*	*	*	on	*	Not	*
Print Position 1 next form					shipment		Available	
FF AFTER LOCAL COPY								
Print Position 1 next line	*	*	*		Not	*		
Print Position 1 next form				*	Available		*	*
FF BEFORE LOCAL COPY								
Print Position unchanged	Not	Not	Not	Not	Not	Not	Not	*
Print Position 1 next form	Available	Available	Available	Available	Available	Available	Available	
GENERATE NL ON RECEIPT OF EM								
No	Not	Not	Not	Not	Not	Not		
Yes	Available	Available	Available	Available	Available	Available	*	*

* denotes the setting.

1 FF also honoured when it occurs at location 50H in the coax communications buffe

C. Command summary

This appendix contains a table of the special feature commands and a table of the IBM datastream commands available with XCTO.

IBM datastream command summary

For full details on these commands, see chapter 2, “Datastream commands.”

Table C-1. **3270/DSC/DSE Commands**

Name	Code
Carriage Return (CR)	X'05'
End of Message (EM)	X'01'
Form Feed (FF)	X'02'
New Line (NL)	X'03'
Null (NUL)	X'00'
Stop (STOP)	X'04'
	X'06'
	X'07'

Table C-2. **SCS commands (coax)**

Name	Code
Backspace (BS)	16
Bell (BEL)	2F
Carriage Return (CR)	0D
Eight Ones	FF
Enable Presentation (ENP)	14
Form Feed (FF)	0C
Graphic Escape (GE)	08gg
Horizontal Tab (HT)	05
Inhibit Presentation (INP)	24
Interchange Record Separator (IRS)	1E
Line Feed (LF)	25
New Line (NL)	15
Null	00
Page Presentation Media (PPM)	2BD2nn48xxxxxxsddoddxxxxxx
Set Attribute (SA)	28ttvv
Set Graphic Error Action (SGEA)	2BC803grop
Set Horizontal Format (SHF)	2BC1nnhhlmrmt1..tn
Set Line Density (SLD)	2BC6nnld
Set Print Density (SPD)	2BD2nn2900cp
Set Text Orientation (STO)	2BD10683xx002D00
Set Vertical Format (SVF)	2BC2nnvvtmbmt1..tn
Space	40
Transparent (TRN)	35nn
Vertical Channel Select (VCS)	04vv
Vertical Tab (VT)	0B

Table C-3. **SCS commands (twinax)**

Name	**Code**
Absolute Horizontal Presentation Position (AHPP)	34C0ah
Absolute Vertical Presentation Position (AVPP)	34C4av
Backspace (BS)	16
Bell (BEL)	2F
Carriage Return (CR)	0D
Eight Ones	FF
Form Feed (FF)	0C
Horizontal Tab (HT)	05
Interchange Record Separator (IRS)	1E
Line Feed (LF)	25
Load Alternate Characters (LAC)	2BFEnnmmeei1... in
New Line (NL)	15
Null	00
Page Presentation Media (PPM)	2BD2nn48xxxxfcsddoddqqdx
Relative Horizontal Presentation Position (RHPP)	34C8rh
Relative Vertical Presentation Position (RVPP)	344Crv
Set Character Density (SCD)	2BD2042900cp
Set Coded Graphic Character Set through Local ID (SCGL)	2BD10381id

Table C-3. **SCS commands (twinax) (continued)**

Name	**Code**
Set Graphic Error Action (SGEA)	2BC8nngguu
Set Horizontal Format (SHF)	2BC1nnhh
Set Line Density (SLD)	2BC6nnld
Set Text Orientation (STO)	2BD3nnF6cacalala
Set Vertical Format (SVF)	2BC2nnvv
Space	40
Switch (SW)	2A
Transparent (TRN)	35nn

Table C-4. **DCA commands**

Name	**Code**
Backspace (BS)	16
Begin Emphasis (BE)	2BD1038A bd
Begin Overstrike (BOS)	2BD4nn72chbpgcgccpcp
Begin Underscore (BUS)	2BD4nn0A01bp
Bell (BEL)	2F
Carriage Return (CR)	0D
End Emphasis (EE)	2BD1028E
End Overstrike (EOS)	2BD40276
End Underscore (EUS)	2BD4020E
Form Feed (FF)	0C
Horizontal Tab (HT)	05
Indent Tab (IT)	39
Index Return (IRT)	33
Justify Text Field (JTF)	2BD2nn03rerepr
Line Feed (LF)	25
New Line (NL)	15
NULL	00
Numeric Backspace (NBS)	36
Page Presentation Media (PPM)	2BD2nn48xxxxfcsddoddqqdx
Release Left Margin (RLM)	2BD2020B
Repeat (RPT)	0A
Required Form Feed (RFF)	3A

Table C-4. **DCA commands (continued)**

Name	**Code**
Required New Line (RNL)	06
Required Space (RSP)	41
Set Exception Action (SEA)	2BD2nn85ecac
Set FID through GFID (SFG)	2BD10705gfgffwfwfa
Set GCGID through GCID (SCG)	2BD10601gcgccpcp
Set Horizontal Margins (SHM)	2BD2nn11lmlmrmrm
Set Horizontal Tab (STAB)	2BD2nn01ffaltabs
Set Indent Level (SIL)	2BD10307il
Set Initial Conditions (SIC)	2BD20345si
Set Justify Mode (SJM)	2BD2nn0Dstpr
Set Line Spacing (SLS)	2BD20309ls
Set Presentation Page Size (SPPS)	2BD2nn40wdwddpdp
Set Printer Set up (SPSU)	2BD2nn4Cxxpfxxsi
Set Single Line Density (SSLD)	2BD20415ldld
Set Text Orientation (STO)	2BD3nnF6cacalala
Set Vertical Margins (SVM)	2BD2nn49tmtmbmbm
Subscript (SBS)	38
Superscript (SPS)	09
Unit Backspace (UBS)	1A
Word Underscore (WUS)	23

Table C-5. **Special feature command summary**

Description of feature	Command	Default
Interface escape character		
Define interface escape character	&&??@	None
Mode change commands		
Enter Filter mode	See Set Filter mode entry string	@Y36,1@
Set Filter mode entry string	@Y200,'<string>'@	@Y36,1@
Exit Filter mode	See Set Filter mode exit string	@Y36,0@
Set Filter mode exit string	@Y201,'<string>'@	@Y36,0@
Enter Multibyte Transparency mode	See Set Transparency mode entry string	@@
Set Transparency mode entry string	@Y202,'<string>'@	@@
Exit Multibyte Transparency mode	See Set Transparency mode exit string	@
Set Transparency mode exit string	@Y203,'<string>'@	@
Single Byte Transparency mode	@nn	None
Enter Data Monitor mode	@T1,	None
Exit Data Monitor mode	@T1,	None
User defined strings		
Download user string	@Y61,'<string>'@	None
Recall user string	@Zn	None
Translate table options		
Create translate table	@Y71,<table no.>@	None
Delete translate table	@Y72,<table no.>@	None

For full details on these commands, see chapter 3.

Table C-5. **Special feature command summary (continued)**

Description of feature	Command	Default
Select translate table	@Y73,<table no.>@	None
Modify translate table	@Y75,<CTT><ISO6937>@	None
Create APL translate table	@Y76,<table no.>@	None
Delete APL translate table	@Y77,<table no.>@	None
Select APL translate table	@Y78,<table no.>@	None
Modify APL translate table	@Y80,<CTT><APL>@	None
Create APL translate table	@Y76,<table no.>@	None
Delete APL translate table	@Y77,<table no.>@	None
Select APL translate table	@Y78,<table no.>@	None
Modify APL translate table	@Y80,<CTT><APL>@	None
Create OCR translate table	@Y81,<table no.>@	None
Delete OCR translate table	@Y82,<table no.>@	None
Select OCR translate table	@Y83,<table no.>@	None
Modify OCR translate table	@Y85,<CTT><OCR>@	None
Print translate table	@T2,	None
GFID cross reference table		
Assign GFID cross reference	@Y97,<GFID> <fontname/string>@	see chapter 5
Delete GFID assignment	@Y97,86@	see chapter 5
Defaults—Page format options		
Lines Per Inch (LPI)	@Y2,n@	6
Characters Per Inch (CPI)	@Y3,n@	10

Table C-5. **Special feature command summary (continued)**

Description of feature	**Command**	**Default**
Line Spacing	@Y4,n@	1
Page Length (MPL)	@Y5,n@	66
Maximum Print Position (MPP)	@Y6,n@	132
LU1 Language	@Y8,n@	14
Top Binding Margin (TBM)	@Y110,n@	0
Left Binding Margin (LBM)	@Y112,n@	0
Automatic New Page	@Y34,n@	1
Form Feed usage	@Y35,n@	0
Automatic New Line	@Y42,n@	1
Suppress CR's and spaces for same position	@Y44,n@	0
Intervention Request (IRQ) timeout	@Y46,n@	12
Defaults—Page orientation options		
Auto page orientation	@Y98,n,t@	n = 1
Tray selection	@Y11,n@	1
Default tray orientation	@Y10,n,t@	n = 2
Defaults—DSC/DSE options		
Case	@Y7,n@	1
Buffer size	@Y1,n@	4
Generate New Line on receipt of EM	@Y41,n@	1
Form Feed before local copy	@Y25,n@	0
Form Feed after local copy	@Y26,n@	1

Table C-5. **Special feature command summary (continued)**

Description of feature	**Command**	**Default**
Null Suppression	@Y27,n@	0
Carriage Return at MPP+1	@Y28,n@	1
New Line at MPP+1	@Y29,n@	1
Form Feed within print buffer	@Y30,n@	0
Form Feed valid	@Y32,n@	0
Form Feed at end of print buffer	@Y31,n@	1
Automatic Form Feed at end of buffer	@Y33,n@	0
Saving default settings		
Save to NVRAM	@X<n>	None

D. 4045 Model 20 emulation

This appendix contains considerations needed when using the 4045 Model 20 emulation.

Set Horizontal Format (SHF) command

- Maximum Print Position (MPP) used = XES default left margin + IBM MPP value
- Left Margin (LM) used = XES default left margin + (IBM LM value - 1) x default XES font width

  Note: When the Auto New Page option is enabled, the above equation is not used. The left margin value used is the XES default left margin which remains constant.
- The Right Margin value is not used.
- Horizontal Tabs used = XES default left margin + (IBM tab value - 1) x default XES font width

  Note: When the Auto New Page option is enabled, the above equation is not used to calculate absolute XES tabs. Tabs are passed as spaces to the printer with the left margin defining the first tab stop.

Handling of Set Vertical Format (SVF) command

- Maximum Page Length (MPL) used = MPL value set at the user interface.
- Top Margin (TM) used = XES default top margin + (IBM TM value - 1) x default XES font line spacing.

Note: When the Auto New Page option is enabled, the new Top Margin to be used is not invoked until the next page.

- Bottom Margin (BM) used = Physical page length - (XES default top margin + (IBM bottom margin x default XES font line spacing))

  Note: When the Auto New Page option is enabled, the current page is printed when MPL is reached. When the Auto New Page option is disabled, the current page is printed when the bottom margin is reached.

- Vertical Tabs used = XES default left margin + (IBM tab value - 1) x default XES line spacing

  Note: When the Auto New Page option is enabled, the equation is not used to calculate absolute XES tabs. Tabs are passed as line feeds to the printer with the top margin defining the first tab stop.

E. Coax communications buffer

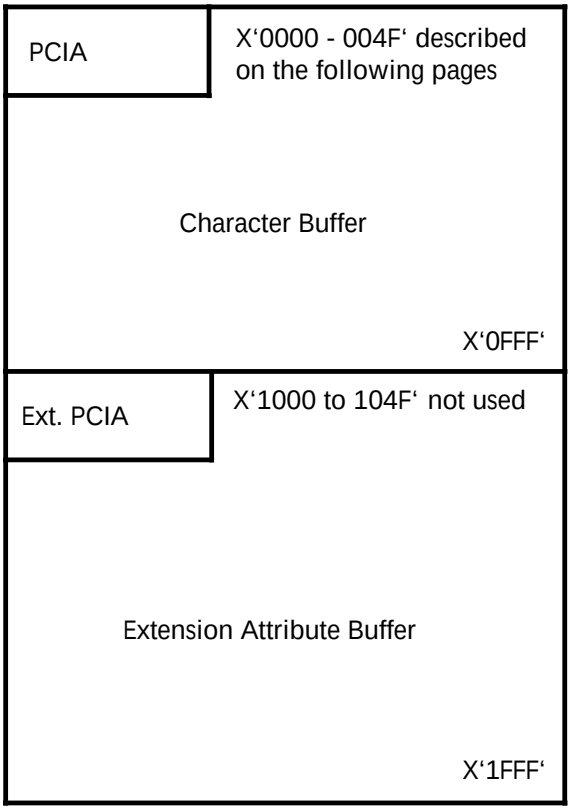
This appendix describes a memory area known as the communications buffer which is used by all coax emulations.

The communications buffer contains a character buffer and an attribute buffer. Each of these buffers contains 4KB of storage.

The first 80 bytes of the character buffer contains the printer control information area (PCIA). The first 80 bytes of the attribute buffer contains the extended PCIA.

The remainder of the character buffer is a message area, which contains data and commands necessary for printing. The attribute buffer can contain additional information about how each character prints. Figure E-1 shows the communications buffer.

Figure E-1. **Communications buffer**



Printer output area

Table E-1. **Printer output area**

Address	Function		Description
X'0000'	Status Register	Bit 0 Bit 1 Bit 2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7	0 - Address 0006 is reserved Data check Order complete Equipment check (hardware or PCIA error) Operator intervention required Sense data available (see byte 3) Input code (see byte 2) available (PA key pressed) Valid switch transition (see byte 1)
X'0001'	Switch Status	Bit 0-2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7	Reserved 0 - Disable base colour switch off 0 - Monochrome output only 0 - Mono/Dual switch in mono state 1 - Mono/Dual switch in dual state 0 - Single/Double space switch in single state 1 - Single/Double space switch in double state 0 - 6/8 LPI switch in 6 LPI state 1 - 6/8 LPI switch in 8 LPI state
X'0002'	Switch Input Code	Code X'50' Code X'5F' Code X'5E' Code X'5D' Code X'6B' Code X'6F'	Attention (PA key pressed while in receive state) PA1 key pressed PA2 key pressed No PA key pressed Inbound data available LU1 mode inbound data without FM header
X'0003'	Sense Data	Code X'01' Code X'02' Code X'03' Code X'04'	Cancel key pressed (in SCS mode) Invalid control code parameter Invalid SCS control code Order reject
X'0004' X'0005'	Inbound Message Length		

Table E-1. **Printer output area** (continued)

Address	Function		Description
X'0006'	Extended Status	Bit 0-7	Reserved
X'0007 to X'0009''	Reserved		
X'000A'	Features	Bit 0 Bit 1 Bit 2 Bit 3 Bit 4 Bit 5 Bit 6 Bit 7	1 - Underline supported 1 - Reverse video supported (not implemented) 1 - Blink supported (not implemented) 0 - Translate table not required Reserved 0 - Format header subset 4 not supported (IPDS) 0 - Save/restore and query list not supported 0 - 3270/DSC/DSE query not supported
X'000B'	Printer Type and Character Set	Bit 0-3 Bit 4-7	Printer type: 0 = 3287 (4045 Model 20) 4 = 3268 and all other emulations 7 = 3262 Character set = 0 (EBCDIC and APL supported)
X'000C'	Features	Bit 0 Bit 1 Bit 2 Bit 3 Bit 4-6 Bit 7	1 - EAB (extension attribute buffer) installed apart from 4045 Model 20 emulation. 1 - APL/Text feature installed (requires EAB) apart from 4045 Model 20 emulation. Reserved SCS feature installed 001 = 960 byte screen size 010 = 1920 byte screen size 011 = 2560 byte screen size 110 = 3564 byte screen size 111 = 3440 byte screen size (only value used for 4045 Model 20 emulation) 1 - Unit ID

Table E-1. **Printer output area** (continued)

Address	Function		Description
X'000D'	Character Buffer Size	Code X'10'	4K basic buffer (does not include EAB)
X'000E'	Extended ID	Bit 0-1 Bit 2 Bit 3 Bit 4 Bit 5 Bit 6-7	0 - Reserved 0 - Colour not supported 1 - LU-1 FM header data stream supported 0 - DSC load structure field order not supported Reserved Reserved
X'000F'	Reserved		

Control unit output area

Table E-2. **Control unit output area**

Address	Function		Description
X'0010'	Mode	Bit 0-4 Bit 5 Bit 6-7	Reserved Enable set attribute control code (SCS only) Ignored
X'00011	Mode	Bit 0-2 Bit 3-4 Bit 5-7	Reserved 00 - Host-directed copy 01 - Host-initiated local copy 10 - Operator-initiated local copy 11 - Reserved 000 - No mode 001 - Datastream compatible mode (DSC) - BSC 101 - Datastream emulation mode (DSE) - SNA 110 - LU-1 mode 111 - Reserved
X'0012' to X'0013'	Message Starting Address (MSA)		These two bytes define the point in the message area where the current message begins
X'0014‘ to X'0015‘	Message Length		These bytes define the length of the current message. If the length is zero, nothing is printed. In SCS mode, data wraps from the end of the character buffer to address X'0050' In non-SCS mode, data is loaded to the end of the character buffer only.
X'0016'	Order	Code X'01' Code X'02' Code X'03' Code X'05' Code X'06' Code X'07'	Abort System status available Print processing Load translate tables (ignored) 3270/DSC/DSE (ignored) DSC load structured field (ignored)

Table E-2. **Control unit output area** (continued)

Address	Function		Description
X'0017'	Order Parameters		The bits of this byte have different meanings for different orders:
	Abort	Bit 0-7	Reserved
	System Status Available	Code X'00' Code X'02' Code X'03	Mode change Enter send state (LU1 mode only) Enter receive state (LU1 mode only)
	SCS Mode - Print Processing	Bit 0	0 - Extended order parameter not used 1 - Extended order parameter valid (byte 0022)
		Bit 1	0 - Not first segment of first-in-chain 1 - First segment of first-in-chain
		Bit 2	0 - Not last segment of last-in-chain 1 - Last segment of last-in-chain
		Bit 3	0 - SCS EBCDIC data code Reserved
		Bit 4-6	Reserved
		Bit 7	Ignored - SCS datastream processing only

Table E-2. **Control unit output area** (continued)

Address	Function		Description
X'0017'	Order Parameters		The bits of this byte have different meanings for different orders:
	Non-LU1 Mode - Print	Bit 0	Reserved
		Bit 1	0 - Reserved 1 - Reserved
		Bit 2	Reserved
		Bit 3	0 - Character buffer control codes X'01 through X'07' are control codes in Base and APL 1 - Character buffer control codes X'01' through X'07 are control codes only if the attribute buffer byte equals xxxxx001 (APL). Otherwise, control codes 01-07 are translated to graphics.
		Bit 4	0 - Print without the attribute buffer 1 - Print with the attribute buffer
		Bit 5-6	00 - Use machine default for dual/monocase 01 - Monocase 10 - Dual Case
		Bit 7	0 - Unformatted mode (honour NL. EM. and CR) 1 - Formatted mode (ignore NL, EM, and CR and print a space for them).
	3270/DSC/DSE Query	bits 0-7	Ignored
	Load Translate Table	Bits 0-7	Ignored
	Load Structured Field	Bits 0-7	Ignored

Table E-2. **Control unit output area** (continued)

Address	Function		Description
X'0018'	Maximum Print Position		This byte specifies the maximum print position for 3270/DSC/DSE mode. If zero, the value defined at the printer control panel is used.
X'0019' to X'0021'	Reserved		
X'0022'	Extended Order		**Note:** Byte 0017, bit 0 must equal 1.
		Bit 0	Reserved.
		Bit 1	0 - Continue on error. Any SCS control code not supported prints a hyphen but does not return an error response. 1 - Stop on error. Any SCS control code not supported returns a “function not supported” response to the control unit and printing stops.
		Bit 2	Ignored
		Bit 3-7	Reserved.
X'0023' to X'0049	Reserved		
X'004A' to X'004D'	Test Message		Test message from control unit: AA 32 74 AA (for 3274) AA 32 76 AA (for 3276)
X'004E' X'004F'	Reserved		

Orders

Orders accepted by the XCTO are operations that control printing and mode changing. The PCIA bytes X‘0016-0017‘ specify the type of order the printer is required to perform. The first byte (X‘0016‘) contains the order and the second byte (X‘0017‘) contains any applicable parameters for that order. The following are valid orders:

01 Abort

02 SSA—System Status Available

03 Print processing

05 Load translate table(s) (ignored)

06 3270/DSC/DSE (DSC) query (ignored)

07 DSC load structured field (IPDS) (ignored)

For any other orders, the XCTO returns an ‘order reject’ and ‘order complete’ to the host system.

Abort

On receipt of an abort order, the XCTO terminates the current order and then responds with order complete in the status byte (byte 'X0000').

This order has no parameters, so the abort order does not use PCIA byte X'0017'.

System Status Available (SSA)

The SSA order allows the host control unit to change the print mode. If the printer is in SCS mode, this order also allows a request for either PA1 or PA2 action by the host.

The parameter byte (PCIA byte X'0017') codes accepted for this order are given on page E-6. If these parameters are incorrect, 'order reject' is returned to the host system.

Print order processing

This order causes printing of the message buffer while taking into account: the print mode (PCIA byte X'0017'), the message starting address (MSA), and the message length (ML) bytes in the PCIA.

The MSA (PCIA bytes X'0012-0013') identifies the position of the first byte of data in the print buffer. If the MSA value is outside print buffer limits, the XCTO immediately returns an 'order reject' and 'order complete' to the host system.

The ML (PCIA bytes X'0014-0015') plus MSA-1 defines the position of the last byte of data in the buffer. If ML is zero, the XCTO returns 'order complete' to the host system without an error condition and without printing anything.

In the SCS mode if ML defines a position beyond the end of the buffer, data wraps from the end of the buffer back to address (X'0050'), the beginning of the data area.

In the DSC mode if ML extends beyond the end of the buffer, printing stops at the end of the buffer. An End of Message (EM) control code in the buffer overrides the ML, terminating the print process at that point in the buffer.

When set correctly, the printer processes characters from the message buffer, starting at the MSA and continuing in a sequential manner for the length of the message. This processing prints the printable characters in the buffer, using any commands also in the buffer to format the printed page as required.

When a print order has been completed, the XCTO loads “order complete” into PCIA byte X'0000' and posts “printer status available.”

3270/DSC/DSE print order processing

In 3270/DSC/DSE (DSC) mode, the message buffer contains DSC codes for printable characters and control functions.

Following the printing of the last line of data in the buffer, an automatic new line is performed *unless* the print position is already in column one or the XCTO‘s DSC options have been set to inhibit this action.

The maximum print position (MPP) from PCIA byte X'0018' specifies the maximum print position for each line of print. If MPP is zero, the print line width is determined by the value set at the printer control panel.

If an entire print line does not contain any printable characters (all are nulls, attributes, or in a nonprint field), it may not be printed depending on how the XCTO's Null Suppression option is set. In order to print a blank line, at least one character in the line must be a space character within a print field, or the Null Suppression option must be disabled.

Invalid control codes are treated as 'nulls'.

In addition to the printer control codes and graphic codes, the data may contain screen-field attribute characters because the printer can be used as local copy printer (copy screen image to printer). A field starts with a field attribute (FA) character and ends with the next FA character. Fields that cannot be printed (e.g., input fields) are treated as blank fields and are called "non-print fields." The FA is normally the first character in a print order and has the following definition, as shown in table E-3.

Table E-3. **Field Attribute (FA) character definitions**

Bit	Value	Description
0,1	11	Field attribute identifier
2,3,4,5	XX11	Nonprint field
	XX10	Print field
	XX01	Print field
	XX00	Print field
6,7	00	Reserved

If the first character in a print order is not an attribute character, the attribute of the first field is determined as follows:

- The print data is searched backwards for a field attribute from MSA + ML-1 to MSA ignoring EM control codes. The first FA found is then treated as if it had occurred at the MSA.

- If no FA is in the data, printing defaults to the normal unprotected attribute X'C0' (print field).

Some of the print data requires special attributes, such as highlighting, colour and the APL character set. For data requiring such specification, the host system places the data byte in the base buffer and the appropriate place in the extension attribute buffer (EAB).

If bit 4 in the PCIA order byte X'0017' is on, the printer uses the attribute data contained in the EAB to decide the appearance of the printed output.

If the EAB modifies a character byte in the base buffer, it is a character attribute (CA). If the EAB modifies an FA byte in the base buffer, it is an extended field attribute (EFA).

Usually the EFA is at the beginning of the EAB. If it is not there, a similar search procedure is executed to find the first FA.

Table E-4 shows the format of the Extended Field Attribute (EFA):

Table E-4. **Extended Field Attribute (EFA)**

Bit	Value	Description
0-1	00 01 10 11	Normal mode Blink character (ignored) Reverse video character (ignored) Underline character (including spaces and nulls)
2-4	xxx	Black
5-7	000 001	Base DSC character set APL DSC character set

Table E-5 shows the format of the Character Attribute (CA):

Table E-5. **Character Attribute (CA)**

Bit	Value	Description
0-1	00 01 10 11	Revert to the EFA Blink character (ignored) Reverse video character (ignored) Underline character
2-4	xxx	Black
5-7	000 001	Revert to the EFA character set APL DSC character set

SCS order processing

In SCS mode, the message buffer contains SCS datastream data, which is made up of control codes (with or without parameters) and EBCDIC printable characters.

Following printing of the last line of data in the buffer, the print position remains at the next character position (no automatic NL occurs).

The printer does not use the extension attribute buffer in SCS mode. The printer accesses the characters and control codes from the start of the data buffer to the end in a sequential manner.

APL characters can be sent to the printer if preceded by the graphic escape character (X'08').

The XCTO emulations check SCS commands when processing them, reporting invalid control codes and invalid parameters as appropriate.

Glossary

APL A Programming Language. Also refers to a symbol set. Fonts for the APL symbol set can be found in the 4213 Coax/Twinax cartridge.

CA Character Attribute. CAs, which appear in the Extension Attribute Buffer, modify printable characters in the Message Data Storage Area. CAs control underlining and use of the base/APL character set.

conserve ribbon The equivalent of “draft quality“ in the impact printer environment. This parameter, which appears in the Page Presentation Media (PPM) DCA command, is used in the auto page orientation algorithm.

COR Computer Output Reduction. COR, which is treated as a third page orientation, can be used to create a scaled-down version of computer output on a landscape letter-sized page.

CTT Custom Translate Table. A table of customised character code mappings. The 4213 Laser Printer Coax/Twinax Interface has a special feature that allows users to remap hex code input to printable characters as desired.

CUOA Control Unit Output Area. The CUOA, which occupies locations X'0010' to X'004F' of the PCIA, contains information regarding orders from the control unit as well as configuration information. The CUOA is written by the cluster controller and read by the printer.

DCA Document Content Architecture. A standard format for word processing and electronic mail in the IBM environment.

DSC Data Stream Compatible. The 4213 Laser Printer will accept the non-SCS data stream from a DSC cluster controller when the Coax/Twinax interface is installed.

DSE Data Stream Emulation. The 4213 will accept the non-SCS data stream from a DSE cluster controller when the Coax/Twinax interface is installed.

draft quality Specified by the "conserve ribbon" parameter in the Page Presentation Media (PPM) DCA command. Used in the auto page orientation algorithm: when draft quality is requested, the page will be COR, if that is the default tray orientation. See also *letter quality.*

EAB Extension Attribute Buffer. The elements in this buffer, which have a one-to-one correspondence with characters and attributes in the MDSA, can be used to turn on underscoring or APL in the Coax DSC environment.

EBCDIC Extended Binary-Coded Decimal Interchange Code—A digital coding system used to represent characters electronically, each character being represented by eight bits. EBCDIC is the character code set accepted by printers in the SCS environment.

EFA Extended Field Attribute. EFAs, which appear in the Extension Attribute Buffer, modify Field Attributes in the Message Data Storage Area. EFAs control underlining and use of the base/APL character set.

FA Field Attribute. Field Attributes, which appear in the MDSA, control print/non-print attributes in DSC systems.

fontroot A font name without the landscape or portrait (-P or -L) orientation suffix.

GFID Global Font Identifier, a number that references a font.

Interface Escape Character A character used in coax/twinax interface escape sequences. See *Special Features*.

IPDS Intelligent Printer Data Stream. A page definition language for electronic page printers in the IBM environment. IPDS is not supported by the 4213 Laser Printer.

IRQ Intervention Required. When a printer fault occurs, the 4213 informs the host system of the need for operator intervention by setting bit 4 of location 0 of the PCIA.

ISO International Standards Organisation.

letter quality Specified by the "standard ribbon" parameter in the Page Presentation Media (PPM) DCA command. Used to determine orientation: when letter quality is requested, the page will be printed portrait rather than in COR, if that is the default tray orientation. See also: *draft quality*.

Logical Page Size The size of printed text, plus top and left margins. Logical Page Size is used in the auto page orientation algorithm. See also *LPL, LPW*.

LPI Lines Per Inch. The LPI printer control panel setting determines the default, which can be overridden by SCS or DCA commands from the host.

LPL Logical Page Length. LPL is determined by the number of lines on the page (MPL), the lines per inch (LPI) and the top margin. See also *Logical Page Size, LPW*.

LPW Logical Page Width. LPW is determined by the number of characters on a line (MPP), the characters per inch (CPI) and the left margin. See also *Logical Page Size, LPL*.

LU1 Logical Unit 1. An SCS device.

LU3 Logical Unit 3. A 3270 data stream (DSC or DSE) device.

MDSA Message Data Storage Area. The area of the coax input buffer, starting at X'50', where printable data resides.

MPL Maximum Print Length. The maximum number of lines on a page. The page length printer control panel setting determines the default MPL, which can be overridden by SCS or DCA commands from the host.

MPP Maximum Print Position. The maximum number of characters on a line. The page width printer control panel setting determines the default MPP, which can be overridden by PCIA location 0018 or by SCS or DCA commands from the host.

NVM Non-Volatile Memory. Data stored in NVM is preserved when the printer is powered off. While data stored on media such as disk or tape is preserved across a power off/on, “NVM“ is not generally used to describe these types of data storage. Rather, NVM is used synonymously with NVRAM.

NVRAM Non-Volatile Random Access Memory. Data stored in this type of random access memory chip is saved across a power off/on, usually due to the presence of a battery backup.

OCR Optical Character Recognition. Also refers to a symbol. Fonts for the OCR symbol set can be found in the 4213 Coax/Twinax cartridge.

PA1 Programme Attention 1. Key input code X'5F' is loaded into POA location 0002 during printer-host communications after the PA1 button is pressed. Note that this is generally done as part of an applications programme running on the host.

PA2 Programme Attention 2. Key input code X'5E' is loaded into POA location 0002 during printer-host communications after the PA1 button is pressed. Note that this is generally done as part of an applications programme running on the host.

PCIA Printer Communications Interface Area. The PCIA, which occupies the first 50 hexadecimal bytes in the input buffer of a coax-attached printer, contains control information. The POA, which occupies the first 10 hexadecimal locations, contains printer information that is read by the cluster controller. The CUOA, which occupies the next 40 hexadecimal locations, contains cluster controller information that is read by the printer.

POA Printer Output Area. The POA, which occupies locations 0 to X'000F' of the PCIA, contains information regarding printer status and configuration. The POA is written by the printer and read by the cluster controller.

PSF Print Services Facility. PSF is the print driver that converts Systems Application Architecture (SAA) source applications data to IPDS (Intelligent Printer Data Stream). PSF also converts Advanced Function Printing Data Stream (AFPDS) to IPDS. **Note:** the 4213 Laser Printer does *not* handle IPDS.

SAA Systems Application Architecture. This integrated architecture, announced by IBM in 1987, has four main components: 1. Common User Access (CUA) addresses user interface issues. 2. Common Programming Interface (CPI) addresses programming languages and related services. 3. Common Communications Support (CCS), the communications component, includes the more modern subsets of SNA. 4. Common Applications, such as office automation.

SCS SNA Character String. SCS Mode can also be referred to as LU1 mode. The 4213 Laser Printer will accept the EBCDIC data stream from an SCS cluster controller when the Coax/Twinax interface is installed.

SNA Systems Network Architecture defines message formats and protocols for IBM network communications.

sense code Applies to coax only. The 4213 will load a sense code into location 0003 in the PCIA when it detects a cancel keypress or an invalid parameter or order from the host. It will also set bit 5 in location 0. When in XRX 4045-20 mode, only the cancel keypress sense code is returned to the host. Note that IRQ, PA1 and PA2 utilise POA locations other than 0003.

Special Features The features accessible when “Full Features“ are selected under the “Special Features“ UI options.

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