IPDS Technical Reference 2

TABLE OF CONTENTS

Manuals for the IPDS card....4
Notice....5
Important....5
How to Read This Manual....6
Symbols....6
About This Book....7
Audience....7
Terminology....7
1. Device Control Command Set
About Device Control Command Set....9
Acknowledgement Reply....10
Activate Resource....13
Resource ID example with RIDF = GRID....16
Resource ID example with RIDF = MVS Host Unalterable Remote Font Environment....17
Resource ID example with RIDF = Coded Font....18
Resource ID example with RIDF = Object-OID....20
Resource ID example with RIDF = Data-object font....20
Begin Page....22
Deactivate Font....23
End....26
End Page....27
Load Copy Control....28
Media Source and Destination Support Matrices....30
Load Font Equivalence....36
Logical Page Descriptor....40
Logical Page Position....45
Presentation Fidelity Control....47
Text Fidelity Control....47
Finishing Fidelity Control....48
Sense Type and Model....49
Execute Order Any State (XOA)....62
XOA Mark Form....62
XOA Exception Handling Control....62

XOA Request Resource List..... 64
Execute Order Home State (XOH)..... 69
XOH Obtain Printer Characteristics.....69
Printable Area Self-Defining Field..... 69
XOH Select Input Media Source.....99
XOH Set Media Origin.....101
XOH Set Media Size.....102
XOH Page Counter Control.....103
XOH Define Group Boundary.....103
XOH Specify Group Operation..... 106

2. Presentation Text Command Set

Presentation Text Commands.....107
Load Equivalence..... 107
Write Text.....107
Temporary Baseline Move..... 124

3. IM Image Command Set

IM Image Commands..... 129
Write Image Control.....130
Write Image..... 134

4. IO Image Command Set

IO Image Commands.....135
Write Image Control 2.....136
Image Output Control.....137
Image Data Descriptor.....139
Write Image 2..... 142

5. Graphics Command Set

Graphics Commands.....147
Write Graphics Control..... 147
Write Graphics..... 155
Write Graphics Defaults..... 155
Begin Segment Introducer..... 156
Set Process Color..... 165
Drawing Order Summary..... 168

6. Bar Code Command Set

Bar Code Commands....171
Write Bar Code Control....172
Bar Code Area Position....172
Bar Code Output Control....173
Bar Code Data Descriptor....174
Write Bar Code....188

7. Overlay Command Set

Overlay Function Set Commands....191

8. Page Segment Command Set

Page Segment Function Set Commands....193

9. Object Container Command Set

Object Container Function Set Commands....195

10. Loaded Font Command Set

Loaded Font Function Set Commands....197
Load Code Page....197
Load Code Page Control....198
Load Font....200
Load Font Character Set Control....202
Load Font Control....203
Load Font Index....208

11. Appendix

Trademarks....211
INDEX....213

Manuals for the IPDS card

Refer to the manuals that are relevant to what you want to do with the IPDS card.

Important

- **Adobe® Acrobat® Reader®/Adobe Reader must be installed in order to view the manuals as PDF files.**

IPDS Supplement (IPDS.pdf)

Explains how to configure the IPDS card for the machine. It also explains about items selectable from the Web browser.

IPDS Printing Configuration Guide (IPDS_CONF.pdf) *English Only

Explains about the environment necessary for connecting the mainframe to the machine and performing IPDS printing.

IPDS Technical Reference 1 (IPDS_TEC1.pdf) *English Only

Explains about commands and functions for IPDS printing.

IPDS Technical Reference 2 (IPDS_TEC2.pdf)*English Only

Explains about IPDS commands.

Note

- For details about the necessary environment and how to install the IPDS card and machine, consult your sales or service representative. For details about the necessary environments and operation of the mainframe, contact IBM.

Notice

Important

Contents of this manual are subject to change without prior notice.

In no event will the company be liable for direct, indirect, special, incidental, or consequential damages as a result of handling or operating the machine.

How to Read This Manual

Symbols

This manual uses the following symbols:

Important

Indicates points to pay attention to when using the machine, and explanations of likely causes of paper misfeeds, damage to originals, or loss of data. Be sure to read these explanations.

Note

Indicates supplementary explanations of the machine's functions, and instructions on resolving user errors.

[ ]

Indicates the names of keys on the machine's display or control panels.

About This Book

This book provides technical reference information about how printers support the IPDS data stream.

Audience

This publication is intended for the system programmers, application programmers, and systems engineers who are familiar with data streams and are writing or modifying programs to operate your printer with the IPDS data stream.

Terminology

Paper Input and Output Receptacles

Input receptacles are called trays. Output receptacles are called stackers or bins.

Related Publications

This book refers to the following:

- PostScript Language Reference Manual, second edition, by Adobe Systems, Inc.
- PCL 5 Printer Language Technical Reference Manual by Hewlett-Packard Company
- PCL 5 Comparison Guide by Hewlett-Packard Company
- Printer Job Language Technical Reference Manual by Hewlett-Packard Company

Note

- For details on the IPDS Architecture, see the Intelligent Printer Data Stream Reference, S544-3417.

1. Device Control Command Set

About Device Control Command Set

Device Control commands control basic device operations, error reporting and recovery, and the construction of logical pages on the physical medium.

Before the host program sends the Begin Page command to begin defining a page to be printed, it should establish the printing environment in which the page is to be printed.

The following Device Control commands are described in this section:

- page 10 "Acknowledgement Reply"
- page 13 "Activate Resource"
- page 22 "Begin Page"
- page 23 "Deactivate Font"
- page 26 "End"
- page 27 "End Page"
- page 28 "Load Copy Control"
- page 36 "Load Font Equivalence"
- page 40 "Logical Page Descriptor"
- page 45 "Logical Page Position"
- page 47 "Presentation Fidelity Control"
- page 49 "Sense Type and Model"
- page 62 "Execute Order Any State (XOA)"
- page 62 "XOA Mark Form"
- page 62 "XOA Exception Handling Control"
- page 69 "Execute Order Home State (XOH)"
- page 69 "XOH Obtain Printer Characteristics"
- page 99 "XOH Select Input Media Source"
- page 101 "XOH Set Media Origin"
- page 102 "XOH Set Media Size"
- page 103 "XOH Page Counter Control"
- page 103 "XOH Define Group Boundary"
- page 106 "XOH Specify Group Operation"
- "XOA-RRL Replies for Font Character Sets", IPDS Technical Reference 1

Acknowledgement Reply

The Acknowledge Reply returns device status, sense data, and other information the host program requests. The printer sends an acknowledgement when it finds either of the following:

- A data stream or device error that requires the printer to return a negative acknowledgement (NACK).
- The Acknowledgement Required (ARQ) flag bit in the command the printer receives is set to 1.

The Acknowledge Reply is returned to the host in the standard IPDS command format although it goes from the printer to the host. See Intelligent Printer Data Stream Reference for details.

The following table lists Bit Codes for IPDS command stream flags for Acknowledge Reply.

Bit Code	Meaning
Bit 0	Reserved
Bit 1	Correlation Number Present
Bit 2	Acknowledgement Continuation
Bits 3-6	Reserved
Bit 7	The Persistent NACK bit is for Non-SNA DSC Mode NACKs only. This bit has no meaning in other attachment environments.

Note

- When a command is received with Bit 1 set, the Acknowledge Reply will be returned with this bit set, indicating that a two byte "Correlation Number" follows.
- The Correlation Number, a two byte identifier, is returned if available for:
  - Synchronous NACKs
  - Response to information request commands
  - Acknowledgement requested (Flag byte bit 0 = 1)
- The Special Data area of the Acknowledgement Reply contains:
  - Error sense bytes when reporting an exception
  - Response to the following information request commands:
    - Sense Type and Model
    - XOH Obtain Printer Characteristics
    - XOA Request Resource List

Offset	Range	Meaning	Error Code
0		ACKNOWLEDGEMENT TYPE: A one byte field that identifies the type of acknowledgement record and contents (if any) of the Special Data area.	
	X'40'	None	
	X'41'	Sense Type and Model	
	X'44'	Request Resource List	
	X'46'	Obtain Printer Characteristics	
	X'C0'	Sense Bytes	
1-2	X'0000' - X'FFFF'	Received Page Counter* * Incremented when the End Page processing is completed.	
3-4	X'0000'- X'FFFF'	Committed Page Counter* * Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
5-6	X'0000'- X'FFFF'	Committed Copy Counter* * Incremented by the number of pages on a sheet when the sheet is stacked.	
7-8	X'0000'- X'FFFF'	Operator Viewing Page Counter* * Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
9-10	X'0000'- X'FFFF'	Operator Viewing Copy Counter* *Incremented by the number of pages on a sheet when the sheet is stacked.	
11-12	X'0000'- X'FFFF'	Jam Recovery Page Counter* *Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
13-14	X'0000'- X'FFFF'	Jam Recovery Copy Counter* *Incremented by the number of pages on a sheet when the sheet is stacked.	

Offset	Range	Meaning	Error Code
15-16	X'0000'-X'FFFF'	Stacked Page Counter* *Incremented by the number of pages on a sheet when the last copy of the sheet is stacked.	
17-18	X'0000'-X'FFFF'	Stacked Copy Counter* *Incremented by the number of pages on a sheet when the sheet is stacked.	
19-n		SPECIAL DATA AREA: This area contains zero or more bytes of additional data as requested by the host program defined by the Acknowledgement Type.	

Activate Resource

This command maps a 6-byte Host Assigned Resource ID (HAID/FIS/Section) to a resident Resource ID of the format specified in the Resource ID Format parameter (Byte 6). The Resource ID formats which are supported may be determined using the XOH OPC command (See page 69 "XOH Obtain Printer Characteristics").

An AR mapping (HAID to Resource ID mapping) remains in effect until:

- an XOH Erase Residual Font Data command or Deactivate Font (See page 23 "Deactivate Font") command is received (the mapping is removed and font deactivated)
- the printer performs an IML (the mapping is removed)

If a Deactivate Font command is received for a single byte font, the font identified by the HAID is deactivated (made unavailable for use by the host), but all other current font mappings remain in effect until one of the actions described in the preceding paragraph occurs. If a Deactivate Font command is received which specifies all single byte fonts, all font mappings are removed as those fonts are deactivated.

The maximum of Activate Resource ID mappings that may be received is limited only by the available memory.

Note

- IPDS architecture describes the mapping and activation of resident resources as two conceptually separate processes. The printer, however, implements mapping and activation as one inseparable process. Un-map and de-activate are also inseparable operations. Thus, a Deactivate Font command directed at a mapped and activated resident font, both un-maps and de-activates the specified font(s).

Offset	Range	Meaning	Error Code
0-1		ENTRY LENGTH	X'028F..01'
	X'0002'	Null entry	
	X'000C'	Specifying without an equivalence	
	X'000E'	Valid for RT=X'06' with RIDF=X'03'	
	X'000E'-008D'	Valid for RT=X'42' with RIDF=X'09'	
	X'0010'	Valid for RT=X'06' or X'07' with RIDF=X'03'	
	X'0012'	Valid for RT=X'41' with RIDF=X'0A'	
	X'0014'	Valid for RT=X'01', X'08', X'09', X'10' with RIDF=X'03'	
	X'001E'	Valid for RT=X'01', X'08', X'09', X'10' with RIDF=X'07'	
	X'00B8'	Valid for RT=X'01' or X'08' with RIDF=X'06'	
2		RESOURCE TYPE (RT)	X'028F..01'
	X'01'	Single byte LF1 coded font	
	X'03'	Double-byte LF1–type coded font sections	
	X'06'	Code Page	
	X'07'	Font Character Set	
	X'08'	Single byte font index	
	X'09'	Double-byte LF1–type coded font section indexes	
	X'10'	Coded Font	
	X'40'	Data object resource	
	X'41'	Data-object font	
	X'42'	Data-object font component	
3-4	X'0001'-X'7EFF'	HOST ASSIGNED ID	X'028F..01'
5	X'41'-X'FE'	Ignored for RT=X'01', X'06', X'07', X'08' and X'10'	

Offset	Range	Meaning	Error Code
6		RESOURCE ID FORMAT (RIDF)	X'028F.. 01'
	X'03'	IBM Registered Global Resource ID parts	
	X'06'	MVS host unalterable remote font environment	
	X'07'	Coded font	
	X'09'	Object-OID	
	X'0A'	Data-object font	
7-8		FONT INLINE SEQUENCE	X'028F.. 01'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees That the Font Inline Sequence is ignored for RT=X'06' and X'07'. For outline fonts with RT=X'10', FIS is used to select the character metrics for a specific writing mode.	
9-10	X'0000'	Reserved	
11		RESOURCE CLASS FLAGS	
	Bit 0 0/1	Public/Private (Resource Capture)	
	Bit 1 0	Retired	
	Bit 2 0/1	Ignored (Reset)	
	Bit 3 0/1	AR NACK Enabled	
	Bit 4 0/1	Outline Font Substitution	
	Bits 5-7 0	Reserved	
Bytes 12-n		RESOURCE ID and triplets	X'028F.. 01'

Note

- Zero or more additional entries, analogous to bytes 0 - n above.

1

Resource ID example with RIDF = GRID

Offset	Range	Meaning	Error Code
12-13		GRAPHIC CHARACTER SET GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	GCSGID	
	X'FFFF'	All characters with assigned code points in the associated code page	
14-15		CODE PAGE GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	CPGID	
	X'FFFF'	Default Code Page (Configuration Settings)	
16-17		FONT GLOBAL ID	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FGID	
	X'FFFF'	Default FGID (Configuration Settings)	
18-19		FONT WIDTH	X'028F.. 02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FW	
	X'FFFF'	Default FW (Configuration Settings)	

Resource ID example with RIDF = MVS Host Unalterable Remote Font Environment

Offset	Range	Meaning	Error Code
12-13		CRC	
14-21		Ignored (MVS Host System ID)	
22-27		Ignored (VOLSER of Host library)	
28-71		Ignored (DSNAME of Host library)	
72-77		Date Stamp	
78-85		Time Stamp	
94-95		GRAPHIC CHARACTER SET GLOBAL ID	X'028F..02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	GCSGID	
	X'FFFF'	All characters with assigned code points in the associated code page	
96-97		CODE PAGE GLOBAL ID	X'028F..02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	CPGID	
	X'FFFF'	Default Code Page (Configuration Settings)	
98-99		CRC	
100-107		Ignored (MVS Host System ID)	
108-113		Ignored (VOLSER of Host library)	
114-157		Ignored (DSNAME of Host library)	

Offset	Range	Meaning	Error Code
158-163		Date Stamp	
164-171		Time Stamp	
172-179		Ignored (Host Library Member Name)	
180-181		FONT GLOBAL ID	X'028F..02'
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FGID	
	X'FFFF'	Default FGID (Configuration Settings)	
182-183		FONT WIDTH	X'028F..02'
	X'0000'	X'0000' No value supplied	
	X'0001' - X'FFFE'	FW	
	X'FFFF'	Default FW (Configuration Settings)	

Resource ID example with RIDF = Coded Font

Offset	Range	Meaning	Error Code
12-13		FONT CHARACTER SET HAID	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	FCS HAID	
14-15		CODE PAGE HAID	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	CP HAID	

Offset	Range	Meaning	Error Code
16-17		GRAPHIC CHARACTER SET GLOBAL ID	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	GCSGID	
	X'FFFF'	All characters with assigned code points	
18-19		CODE PAGE GLOBAL ID	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	CPGID	
	X'FFFF'	Default Code Page (Configuration Settings)	
20-21		FONT GLOBAL ID	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FGID	
	X'FFFF'	Default FGID (Configuration Settings)	
22-23		FONT WIDTH	
	X'0000'	No value supplied	
	X'0001' - X'FFFE'	FW	
	X'FFFF'	Default FW (Configuration Settings)	
24		PATTERN TECHNOLOGY ID	
	X'00'	No value supplied	
	X'1E'	Composite technology	
	X'1F'	Adobe Type-1 PFB	
25		Reserved	

Offset	Range	Meaning	Error Code
26-27		VERTICAL SCALE FACTOR	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	VSF in 1440th of an inch	
28-29		HORIZONTAL SCALE FACTOR	
	X'0000'	No value supplied	
	X'0001' - X'7FFF'	HSF in 1440th of an inch	

Resource ID example with RIDF = Object-OID

Offset	Range	Meaning	Error Code
12		IDENTIFIER	
	X'06'	Short Form OID	
13		OID LENGTH	
	X'00' - X'7F'		
2 to end		Unique OID	
	Any Value		

Resource ID example with RIDF = Data-object font

Offset	Range	Meaning	Error Code
12-13		Base Font HAID	
	X'0001' - X'7EFF'	TrueType/OpenType font or TrueType/OpenType collection	

Offset	Range	Meaning	Error Code
14-15		CODE PAGE HAID	
	X'0000'	No Value supplied	
	X'0001' - X'7EFF'	CP HAID	
16-17		TTC Font Index	
	X'0000' - X'FFFF'	Font Identifier	
2 to end		Triplets (One or more of the following triplets)	
	X'02'	Fully Qualified Name triplet	
	X'50'	Encoded Scheme ID triplet	
	X'8B'	Data-Object Font Descriptor triplet	
	X'8D'	Linked Font triplet	

Begin Page

This command is only valid in home state and causes the printer to enter page state. See the Intelligent Printer Data Stream Reference for details.

Note

- At Begin Page processing time a test for media source and destination compatibility will be performed. If it is determined that the processing of this page with the media source and media destination specified is incompatible an exception X'0237..04' will be reported.

Deactivate Font

The Deactivate Font command carries one to six bytes of data used by the host to deactivate one or more coded fonts, coded font indexes, font character sets, or code pages.

Offset	Range	Meaning	Error Code
0		DEACTIVATION TYPE	X'0217..02' X'02C5..01' X'02C6..01'
	X'11'	Deactivate one single-byte LF1 Coded Font and related indexes	
	X'12'	Deactivate one single-byte font index	
	X'1E'	Deactivate all single-byte LF1 Coded Fonts and all indexes	
	X'1F'	Deactivate all single-byte LF1 Coded Fonts and all indexes (same as above)	
	X'20'	Deactivate double-byte LF1 Coded Font section and related indexes	
	X'21'	Deactivate double-byte LF1 Coded Font section, all higher sections and all related indexes	
	X'22'	Deactivate a font index for a doublebyte Coded Font section	
	X'2F'	Deactivate all double-byte LF1 Coded Fonts and all related indexes	
	X'30'	Deactivate one Code Page	
	X'3F'	Deactivate all Code Pages	
	X'40'	Deactivate one Font Character Set	
	X'4F'	Deactivate all Font Character Sets	
	X'50'	Deactivate one LF1 or LF3 Coded Font	
	X'51'	Deactivate one LF1 or LF3 Coded Font and all associated components	
	X'5D'	Deactivate all resident Coded Fonts and all associated components	
	X'5E'	Deactivate all Coded Fonts	
	X'5F'	Deactivate all Coded Fonts and all associated components	
	X'60'	Deactivate a data-object font	
	X'6E'	Deactivate all data-object fonts	

Offset	Range	Meaning	Error Code
1-2	X'0001' - X'7EFF'	HOST ASSIGNED ID (Deactivation Types X'11', X'12', X'20', X'21', X'22', X'30', X'40', X'50' and X'51')	X'0214..02' X'0215..02' X'02C5..01' X'02C6..01'
3		SECTION ID	
	X'00'	Single-byte font	
	X'41' - X'FD'	Double-byte font (Deactivation types X'20', X'21' and X'22')	
4-5		FONT INLINE SEQUENCE (Deactivation Type X'12' and X'22')	X'0240..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	

End

The End command is the ending control for a series of Write Image, Write Image 2, Write Graphics, Write Bar Code, Load Code Page, or Load Font commands. This command marks either the end of an image object, a graphics object, a bar code object, or the end of a downloaded font sequence. See the Intelligent Printer Data Stream Reference, S544-3417, for more details.

End Page

The End Page (EP) command causes the printer to return to home state from page state, page segment state, or overlay state and thus marks the end of a page, a page segment, or an overlay. The EP command is an implicit command to schedule that page for printing if the command is being used to exit page state; all data for that page is available to the printer. Zero or more data bytes can be transmitted but are ignored. See the Intelligent Printer Data Stream Reference, S544-3417, for more details.

Load Copy Control

A copy control record 2 to 32760 bytes long specifies how the printer is to modify and print logical pages in one or more copy subgroup definitions. Each copy subgroup definition can be from 2 to 254 bytes long (divisible by 2). The maximum number of key-words that the host program can specify in a copy subgroup definition is:

- X'80nn' specify 1 time
- X'90nn' specify 1 time
- X'91nn' specify 1 time
- X'C1nn' specify 1 time
- X'C2nn' specify 1 time
- X'D1nn' specify 1 to 126 times
- X'E1nn' specify 1 to 126 times
- X'E4nn' specify 1 to 63 times
- X'E5nn' specify 1 to 63 times

Note

- Actual tray capacity is determined by media weight.
- The machine supports media source tray numbering. Media source values in the LCC support tables represent the default settings when the printer is initially installed. The printer's control panel menu mode is provided to allow customers to specify the source tray numbers to meet requirements of legacy applications. Example: customer might want to address the Manual Tray as tray 4 instead of the tray 100 (default).
- For the tray in which "envelope" has been specified as the paper type, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8040', X'8041', etc. If a different paper type is specified for the tray, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8000', X'8001', etc. In regards to the bypass tray and default tray, even if you specify "envelope" as the paper type, the tray value will not be changed.

Offset	Range	Meaning	Error Code
0	X'02' - X'FE'	COPY SUBGROUP DEFINITION LENGTH	
1	X'01' - X'FF'	NUMBER OF IDENTICAL COPIES	X'0231..01'

Offset	Range	Meaning	Error Code
2-n		COPY MODIFICATION KEYWORDS	X'0232..01'
		Media Source (Reference Notes)	
	X'8000'	Tray 1	X'02C2..02'
		Tray 2 *1	X'02C8..01'
	X'8000'	Tray 1 (Paper type: Envelope) + Tray 2 + Bypass Tray Tray 1 (Paper type: Envelope) + Tray 2 + Tray 3 + Bypass tray Tray 1 (Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'8001'	Tray 1 + Tray 2 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
		Tray 3 *1	
	X'8001'	Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Bypass tray Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'8002'	Tray 1 + Tray 2 + Tray 3 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
		Tray 4 *1	
	X'8002'	Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'8003'	Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'8063'	Bypass tray	
	X'80FF'	Default tray	
		Media Destination (Byte Pairs)	
	X'9101'	Standard tray	

*1 Available values vary depending on the installed option.

Media Source and Destination Support Matrices

The following tables are provided to document Media Source and Destination support. This information is provided to ensure better overall understanding of the media handling characteristics. For more details on the actual X and Y media extents see page 69 "Printable Area Self-Defining Field".

Media Source and Destination Support Matrices

○= Duplex SEF / △ = Duplex LEF / ● = SEF / ▲ = LEF

	Tray 1 Capacity: 250	Tray 2 Capacity: 500	Tray 3 Capacity: 500	Tray 4 Capacity: 500	Bypass tray Capacity: 100
A3 (297 × 420 mm)	○	○	○	○	○
A4 (210 × 297 mm)	○ △	○ △	○ △	○ △	○ △
A5 (210 × 148 mm)	○ △	○	○	○	○ △
A6 (105 × 148 mm)	○				○
B4 (257 × 364 mm)	○	○	○	○	○
B5 (182 × 257 mm)	○ △	○ △	○ △	○ △	○ △
B6 (128 × 182 mm)	○				○ ▲
DLT (11 × 17 in.)	○	○	○	○	○
Legal (8.5 × 14 in.)	○	○	○	○	○

	Tray 1 Capacity: 250	Tray 2 Capacity: 500	Tray 3 Capacity: 500	Tray 4 Capacity: 500	Bypass tray Capacity: 100
Foolscap (8.5 × 13 in.)	○	○	○	○	○
Letter (8.5 × 11 in.)	○ △	○ △	○ △	○ △	○ △
GovernmentLG (8.25 × 14 in.)	○				○
Folio (8.25 × 13 in.)	○	○	○	○	○
F/GL (8 × 13 in.)	○	○	○	○	○
Eng Quatro (8 × 10 in.)	○				○
Executive (7.25 × 10.5 in.)	○ △	○ △	○ △	○ △	○ △
HalfLetter (5.5 × 8.5 in.)	○	○	○	○	○ ▲
Com10 (4.125 × 9.5 in.)	●				●
Monarch (3.875 × 7.5 in.)	●				●
C5 (162 × 229 mm)	● ▲				● ▲
C6 (114 × 162 mm)	●				●

	Tray 1 Capacity: 250	Tray 2 Capacity: 500	Tray 3 Capacity: 500	Tray 4 Capacity: 500	Bypass tray Capacity: 100
DL Env (110 × 220 mm)	●				●
8K (267 × 390 mm)	○	○	○	○	○
16K (195 × 267 mm)	○ △	○ △	○ △	○ △	○ △
11 × 15 in.	○				○
10 × 14 in.	○				○
8.5 × 12 in.	○				○
Custom Sizes	*1	*2	*2	*2	*3

*1 90.0 × 148.0 mm to 297.0 × 432.0 mm

*2 139.7 × 182.0 mm to 297.0 × 432.0 mm

*3 64.0 × 127.0 mm to 297.0 × 1260.0 mm

	Standard tray Capacity: 250
A3 (297 × 420mm) SEF	Yes
A4 (210 × 297mm) SEF / LEF	Yes
A5 (210 × 148mm) SEF / LEF	Yes

	Standard tray Capacity: 250
A6 (105 × 148mm) SEF	Yes
B4 (257 × 364 mm) SEF	Yes
B5 (182 × 257mm) SEF / LEF	Yes
B6 (128 × 182mm) SEF / LEF	Yes
DLT (11 × 17 in.) SEF	Yes
Legal (8.5 × 14in.) SEF	Yes
Foolscap (8.5 × 13in.) SEF	Yes
Letter (8.5 × 11in.) SEF / LEF	Yes
GovernmentLG (8.25 × 14 in.) SEF	Yes

	Standard tray Capacity: 250
Folio (8.25 × 13in.) SEF	Yes
F/GL (8 × 13in.) SEF	Yes
Eng Quatro (8 × 10 in.) SEF	Yes
Executive (7.25 × 10.5in.) SEF / LEF	Yes
HalfLetter (5.5 × 8.5in.) SEF / LEF	Yes
Com10 (4.125 × 9.5in.) SEF	Yes
Monarch (3.875 × 7.5in.) SEF	Yes
C5 (162 × 229mm) SEF / LEF	Yes
C6 (114 × 162mm) SEF	Yes

	Standard tray Capacity: 250
DL Env (110 × 220mm) SEF	Yes
8K (267 × 390mm) SEF	Yes
16K (195 × 267mm) SEF / LEF	Yes
11 × 15 in. SEF	Yes
10 × 14 in. SEF	Yes
8.5 × 12 in. SEF	Yes
Custom Sizes	64.0 × 127.0 mm to 297.0 × 1260.0 mm

Load Font Equivalence

The font equivalence record is a list of 0 to 254 font equivalence entries (each entry is 16 bytes). The font equivalence record permits the host program to equate a Local-Font ID (specified in text control page 115 "Set Coded Font Local", page 174 "Bar Code Data Descriptor", page 172 "Write Bar Code Control", or graphics order "Character Set", IPDS Technical Reference 1) with:

- Font Host Assigned ID (HAID)
- The Font Inline Sequence or character rotation table to be used when processing characters
- Global Resource ID (GRID) for resident fonts. The GRID is made up of the following components:
    - GCSGID Graphic Character Set Global ID
    - CPGID Code Page Global ID
    - FGID Font Global ID
    - FW Font width in 1/1440 inch units

If a GRID is specified in bytes 5-12, the entry is requesting the activation of a coded font and assigning a HAID to it. The printer uses the information provided in the GRID to locate the component parts of the coded font. First, the GCSGID and FGID values are used to find the font character set, and GCSGID and CPGID are used to find the code page. In some cases, the printer will locate the code page using just the CPGID value. If the character set and code page are not found in the above manner, information in the GRID will be used together with the Font Inline Sequence value (Bytes 3-4) to locate a single-byte fully described font and font index.

The set of supported GCSGID/CPGID/FGID/FW (GRID) combinations (described in "Code Page and Font Identification", IPDS Technical Reference 1) is available to the host PSF by means of the XOA-RRL command. For typographic and scalable fonts, a Font Width (FW) must be specified in order to uniquely select a point size, unless FW=0 or X'FFFF', in which case the printer's control panel [Characters Per Inch] setting is used ([Characters Per Inch] on the IPDS Menu).

Exception X'021D..02' is reported back if a non-zero GRID is requested with parts that are not supported in the printer, except in the case of GCSGID subset substitution or LFE Bold Attribute substitution.

For outline coded fonts, the FW value is used to derive a scale factor as follows:

- For typographic and proportionally spaced fonts, both horizontal and vertical scale factors are 3 (FW).
- For fixed pitch, uniform character increment fonts, both horizontal and vertical scale factors are derived using the following algorithm (fractions are truncated):

  `V_Scale = H_Scale = 1000 *1 FW/SPACE`

  In this case SPACE is the value of the Space Character increment in relative units.

*1 4028-type font substitution is provided as the printer's control panel feature. It is independent of the device emulation mode setting (native or 4028). Default is No Font Substitution.

Offset	Range	Meaning	Error Code
0	X'00' - X'FE'	LOCAL-FONT ID	X'0219..02'
	X'FF'	Reserved	X'0218..02'
1-2	X'0001' - X'7EFF'	FONT HOST ASSIGNED ID	X'0218..02' X'021F..02'
3-4		FONT INLINE SEQUENCE	X'0247..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
5-6		GCSGID	
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'FFFE'	Graphic Character Set Global ID	
	X'FFFF'	All characters with assigned code points in the associated code page	
7-8		CPGID	X'021D..02'
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'FFFE'	Code Page Global ID	
	X'FFFF'	Printer Default (Configuration Setting)	

Offset	Range	Meaning	Error Code
9-10		FGID	X'021D.. 02'
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'FFFE'	Font Global ID	
	X'FFFF'	Printer Default (Configuration Setting)	
11-12		FW	
	X'0000'	No value assigned (Note 2)	
	X'0001' - X'7FFF'	Font Width (Ignored for Fixed Pitch Fonts)	
	X'FFFF'	Printer Default as specified by Configuration Settings	
13	X'00'	Reserved	
14		FONT ATTRIBUTES (Note 3)	
	Bit 0 0/1	Ignored (Symbol Sets)	
	Bits 1-2 00	Reserved	
	Bit 3 0/1	Ignored (Double High)	
	Bit 4 0/1	Ignored (Italics)	
	Bit 5 0/1	Ignored (Double Strike)	
	Bit 6 0/1	Bold = 1	
	Bit 7 0/1	Ignored (Double Wide)	
15	X'00'	Reserved	
16-n		Additional LFE ENTRIES	X'023A.. 02'

Note

- For LF1 coded fonts, FIS specifies the font index table for character rotation. For LF3 coded fonts, FIS is used to select the metrics for a specific writing mode.
- Global Resource IDs (bytes 5-12) apply to printer resident fonts only. If these fields are all X'0000', then an activation is not done. If GCSGID and/or FW are 0 or X'FFFF':

    - CPGID (non-zero) defines the CPGID/GCSGID
    - FGID (non-zero) defines the FGID/FW (Non-Typographic)
    - FGID (non-zero) and the printer's control panel CPI defines the FGID/FW (Typographic)
- When the chosen font and attribute combination is restricted by a licensing agreement the font attributes may be executed by substitution or other means. If an appropriate font is not available, the attribute may not occur. Also, with font substitution, the available characteristics may change. Combinations of attributes may not be available. Font attributes will not be applied to host downloaded fonts.

Logical Page Descriptor

Before the printer can present a page of data it must know the following:

- The units in which distances have been measured
- The boundaries of the logical page
- Initialization values for control parameters (Margins, Line spacing...)

The controls established in a Logical Page Descriptor command remain in effect until the next Logical Page Descriptor is received unless superseded by explicit controls in other commands (See page 107 "Write Text"). In any case, the latest LPD control values are restored with each Begin Page or Begin Overlay command.

The LPD command is valid with 24, 28, 34, 36, 38, 40, 41 or 43 bytes. The printer accepts the LPD command using any of these valid lengths.

Offset	Range	Meaning	Error Code
0		UNIT-BASE (Measurement Units)	X'0264..02'
	X'00'	10 in.	
	X'01'	10 centimeters	
1		Reserved	
2-3		Xp AND I L-units PER UNIT-BASE	X'0260..02'
	X'3840'	14400 L-units per 10 in.	
	X'1626'	5670 L-units per 10 centimeters	
	X'0960'	2400 L-units per 10 in.	
	X'03B1'	945 L-units per 10 centimeters	
4-5		Yp AND B L-units PER UNIT-BASE	X'0261..02'
	X'3840'	14400 L-units per 10 in.	
	X'1626'	5670 L-units per 10 centimeters	
	X'0960'	2400 L-units per 10 in.	
	X'03B1'	945 L-Units per 10 centimeters	
6		Reserved	

Offset	Range	Meaning	Error Code
7-9	X'000001' - X'007FFF'	Xp-EXTENT OF LOGICAL PAGE (Width) See "Notation Conventions", IPDS Technical Reference 1.	X'0262..02'
10		Reserved	
11-13	X'000001' - X'007FFF'	Yp-EXTENT OF LOGICAL PAGE (Height) See "Notation Conventions", IPDS Technical Reference 1.	X'0263..02'
14		Reserved	
15		Ignored (Ordered Data)	
16-23		Reserved	
24-25		I-AXIS ORIENTATION	X'0268..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
	X'FFFF'	Printer Default	
26-27		B-AXIS ORIENTATION	X'0269..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
	X'FFFF'	Printer Default See page 123 "Set Text Orientation" for valid combinations of I-axis and B-axis orientations.	
28-29	X'0000' - X'7FFF'	INITIAL I PRINT COORDINATE See "Notation Conventions", IPDS Technical Reference 1.	X'026A..02'

Offset	Range	Meaning	Error Code
30-31	X'0000' - X'7FFF'	INITIAL B PRINT COORDINATE See "Notation Conventions", IPDS Technical Reference 1.	X'026B..02'
32-33	X'0000' - X'7FFF'	INLINE MARGIN See "Notation Conventions", IPDS Technical Reference 1.	X'0210..01'
	X'FFFF'	Printer Default	
34-35	X'0000' - X'7FFF'	INTERCHARACTER ADJUSTMENT (+) See "Notation Conventions", IPDS Technical Reference 1.	X'0212..01'
	X'FFFF'	Printer Default	
36-37		Reserved	
38-39	X'0000' - X'7FFF'	BASELINE INCREMENT See "Notation Conventions", IPDS Technical Reference 1.	X'0211..01'
	X'FFFF'	Printer Default	
40	X'00' - X'FE'	LOCAL FONT ID	
	X'FF'	Printer Default	

Offset	Range	Meaning	Error Code
41-42		TEXT COLOR	X'0258..03'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0008'	Black	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	
	X'FFFF'	Printer Default (Black)	

Offset	Range	Meaning	Error Code
43-end		LPD Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the LPD command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of LPD triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Simulation", IPDS Technical Reference 1. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the LPD command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of LPD triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IDPS Technical Reference 1.	

Logical Page Position

This command defines the position on the physical sheet of paper where the logical page is to be placed.

Offset	Range	Meaning	Error Code
0	X'00'	RESERVED	
1-3	X'FF8000' - X'007FFF'	Xm OFFSET of the LOGICAL PAGE ORIGIN in L-Units See "Notation Conventions", IPDS Technical Reference 1.	X'02A4..01' X'02AD..01'
4		PAGE PLACEMENT	
	X'00'	Default placement	
	X'10'	Partition 1, front side	
	X'11'	Partition 1, back side	
	X'20'	Partition 2, front side	
	X'21'	Partition 2, back side	
	X'30'	Partition 3, front side	
	X'31'	Partition 3, back side	
	X'40'	Partition 4, front side	
	X'41'	Partition 4, back side	
5-7	X'FF8000' - X'007FFF'	Ym OFFSET of the LOGICAL PAGE ORIGIN in L-Units See "Notation Conventions", IPDS Technical Reference 1.	X'02A5..01' X'02AD..01'

Offset	Range	Meaning	Error Code
8-9		PAGE ORIENTATION	
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees Explicit placement is supported.	

Presentation Fidelity Control

The Presentation Fidelity Control (PFC) command is only valid in home state and specifies the fidelity requirements for certain presentation functions. The desired fidelity for each supported presentation function can be specified with a triplet on the PFC command. The activate flag can be used to reset all fidelity controls to their default settings before activating the settings specified in the PFC triplets. A PFC command with no triplets and with the activate flag set to B'0' resets all fidelity controls to their default settings.

Offset	Range	Meaning	Error Code
0	X'00'	RESERVED	
1		FLAGS	
	Bit 0	ACTIVATE	
	0	Reset to default fidelity controls and activate PFC triplets	
	1		
	Bits 1-7	Reserved	
	00000000 00000000		
2-3	X'0000'	Reserved	
4-n		Triplets (Zero or more optional PFC triplets)	X'0254..05'
		X'86' Text Fidelity Control	
		X'88' Finishing Fidelity Control	

Text Fidelity Control

The Text Fidelity triplet specifies the exception continuation and reporting rules when an unrecognized or unsupported text control sequence is encountered.

Offset	Range	Meaning	Error Code
0	X'07'	LENGTH	X'0254..51'
1	X'86'	Text Fidelity Triplet ID	

Offset	Range	Meaning	Error Code
2		CONTINUE	X'0254..52'
	X'01'	Stop on Exception ID X'0200..01'	
	X'02'	Continue Processing Write Text Data	
3	X'00'	Reserved	
4		REPORT	X'0254..53'
	X'01'	Report X'0200..01' Exception	
	X'02'	Do Not Report X'0200..01' Exception	
5-6	X'0000'	Reserved	

Finishing Fidelity Control

The Finishing Fidelity triplet specifies the exception continuation and reporting rules for finishing exceptions. This fidelity control applies when a request for a specific finishing operation cannot be satisfied.

Offset	Range	Meaning	Error Code
0	X'07'	LENGTH	X'0254..51'
1	X'86'	Text Fidelity Triplet ID	
2		CONTINUE	X'0254..52'
	X'01'	Stop at first finishing exception	
	X'02'	Continue without the finishing operation	
3	X'00'	Reserved	
4		REPORT	X'0254..53'
	X'01'	Report Finishing Exceptions	
	X'02'	Do Not Report Finishing Exceptions	
5-6	X'0000'	Reserved	

Sense Type and Model

Causes the printer to place into the Special Data Area of the Acknowledge Reply (See page 10 "Acknowledgement Reply") a record containing type and model information and the functions the printer supports.

This command is effectively a NOP if the ARQ bit is NOT ON in the command header.

Sense Type and Model

Offset	Range	Meaning
0	X'FF'	Convention
1-2		Product Code
	X'2707'	This Machine
	X'4028'	4028 Emulation (4028)
3		Model
	X'01'	This machine
	X'00'	4028 Emulation (Simplex)
	X'12'	4028 Emulation (Duplex)
4-5	X'0000'	Reserved

Device-Control Command Set

Offset	Range	Meaning
0-1	X'nnnn'	VECTOR LENGTH
2-3	X'C4C3'	DEVICE CONTROL Command-Set ID
4-5	X'FF10'	DC1 Subset ID
6-7	X'6001'	MULTIPLE COPY and COPY-SUBGROUP support in LCC
8-9	X'6002'	Media-source-selection support in LCC
10-11	X'6003'	Media-destination-selection support in LCC
12-13	X'6101'	Explicit Page Placement and Orientation Support
14-15	X'6201'	LOGICAL PAGE AND OBJECT AREA COLORING support

Offset	Range	Meaning
16-17	X'7008'	Set Presentation Environment
18-19	X'702E'	ACTIVATE RESOURCE Command support
20-21	X'7034'	PRINT FIDELITY Command support
22-23	X'706B'	ICMR command support
24-25	X'8008'	XOA Order MARK FORM
26-27	X'800A'	XOA Order ALTERNATE OFFSET STACKER
28-29	X'80F2'	XOA Order DISCARD BUFFERED DATA
30-31	X'80F4'	XOA Order REQUEST RESOURCE LIST
32-33	X'80F6'	XOA Order EXCEPTION HANDLING CONTROL
34-35	X'80F8'	XOA Order PRINT QUALITY CONTROL
36-37	X'9001'	XOH Order PRINT BUFFERED DATA
38-39	X'9003'	XOH Order SPECIFY GROUP OPERATION
40-41	X'9004'	XOH Order DEFINE GROUP BOUNDARY
42-43	X'9005'	XOH Order ERASE RESIDUAL PRINT DATA
44-45	X'9007'	XOH Order ERASE RESIDUAL FONT DATA
46-47	X'900D'	XOH Order STACK RECEIVED PAGES
48-49	X'9013'	XOH Order EJECT to FRONT FACING
50-51	X'9015'	XOH Order SELECT INPUT MEDIA SOURCE
52-53	X'9016'	XOH Order SET MEDIA ORIGIN
54-55	X'9017'	XOH Order SET MEDIA SIZE
56-57	X'e000'	CMRs can be captured
58-59	X'e001'	Host-activated link color conversion CMRs supported
60-61	X'e004'	Host-activated indexed CMRs supported
62-63	X'e102'	Pass-thru audit color conversion CMRs supported
64-65	X'F001'	END PERSISTENT NACK Without Leaving IPDS

Offset	Range	Meaning
66-67	X'F200'	OBJECT DATE AND TIME STAMP TRIPLETS SUPPORTED
68-69	X'F201'	ACTIVATION (AR) FAILED NACK SUPPORTED
70-71	X'F202'	Font resolution and metric technology triplets supported
72-73	X'F203'	Metric adjustment triplets supported in AR commands
74-75	X'F204'	Data-object font support
76-77	X'F205'	Color Mgmt Triplet Support
78-79	X'F206'	Device Appearance Triplet support in SPE cmd
80-81	X'F601'	Position check highlighting support in XOA EHC
82-83	X'F602'	Independent exception page print in XOA-EHC Independent Exception Page Print is only present in Native mode, not 4028 Emulation mode.
84-85	X'F804'	SIMPLEX and DUPLEX 4-UP supported in LCC
86-87	X'FF01'	Position exception sense format (1)
88-89	X'FB00'	All architected units of measure
90-91	X'FC00'	All function listed for IS/3 is supported

Presentation Text Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'D7E3'	PRESENTATION TEXT Command Set - TX1 Subset
4-5	X'FF30'	PT3 Data
6-7	X'1001'	UNORDERED TEXT
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.

Offset	Range	Meaning
10-11	X'50FF'	8 TEXT ORIENTATIONS supported

IM Image Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'C9D4'	IM IMAGE Command Set - IM1 Subset
4-5	X'FF10'	IMD1 Data
6-7	X'1001'	UNORDERED IMAGE BLOCKS
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'A004'	ALL 4 ORIENTATIONS Supported

IO Image Command Set (IOCA FS10)

Offset	Range	Meaning
0-1	X'0022'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF10'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
12-13	X'5001'	MMR Compression algorithm supported
14-15	X'5003'	Uncompressed Image supported

Offset	Range	Meaning
16-17	X'5006'	RL4 Compression supported
18-19	X'5081'	G3 Facsimile Coding Scheme (CCITT G3MR)
20-21	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
22-23	X'5101'	Bit ordering supported
24-25	X'5204'	Unpadded RIDIC Recording Algorithm supported
26-27	X'5505'	Multiple Image Content Supported
28-29	X'A004'	All four orientations supported
30-31	X'F300'	Replicate and Trim mapping supported
32-33	X'F301'	Scale-to-fill mapping supported

Note

- The Replicate and Trim Mapping Control Option is not supported when IPDS Print Mode = STD (Standard 300 dpi).

IO Image Command Set (IOCA FS11)

Offset	Range	Meaning
0-1	X'0028'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF11'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4020'	LIMITED SIMULATED COLOR SUPPORTED
12-13	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
14-15	X'4003'	COLOR of MEDIUM SUPPORTED MULTIPLE-COLOR SUPPORTED

Offset	Range	Meaning
16-17	X'4401'	Extended IOCA Bi-level Image Color supported
18-19	X'5001'	MMR Compression algorithm supported
20-21	X'5003'	Uncompressed Image supported
22-23	X'5008'	ABIC Compression supported
24-25	X'500A'	Concatenated ABIC
26-27	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
28-29	X'5083'	ISO/ITU-TSS JPEG supported
30-31	X'5101'	Bit ordering supported
32-33	X'5204'	Unpadded RIDIC Recording Algorithm supported
34-35	X'5505'	Multiple Image Content supported
36-37	X'A004'	All four orientations supported
38-39	X'F301'	Scale-to-fill mapping supported

IO Image Command Set (IOCA FS40)

Offset	Range	Meaning
0-1	X'0026'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF40'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
12-13	X'4401'	Extended IOCA Bi-level Image Color supported
14-15	X'4402'	Extended IOCA Tile-Set Color support

Offset	Range	Meaning
16-17	X'5001'	MMR Compression algorithm supported
18-19	X'5003'	Uncompressed Image supported
20-21	X'5008'	ABIC Compression supported
22-23	X'5080'	G3 Facsimile Coding Scheme (CCITT G3MH)
24-25	X'5081'	G3 Facsimile Coding Scheme (CCITT G3MR)
26-27	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
28-29	X'5101'	Bit ordering supported
30-31	X'5204'	Unpadded RIDIC Recording Algorithm supported
32-33	X'5505'	Multiple image Content supported
34-35	X'A004'	All four orientations supported
36-37	X'F301'	Scale-to-fill mapping supported

IO Image Command Set (IOCA FS42)

Offset	Range	Meaning
0-1	X'0024'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF42'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED
12-13	X'4401'	Extended IOCA Bi-level Image Color SDF supported
14-15	X'4402'	Extended IOCA Tile-Set Color support
16-17	X'5001'	MMR Compression algorithm supported
18-19	X'5003'	Uncompressed Image supported
20-21	X'5008'	ABIC Compression supported

Offset	Range	Meaning
22-23	X'5020'	Solid Fill Rectangle
24-25	X'5082'	G4 Facsimile Coding Scheme (CCITT G4MMR)
26-27	X'5101'	Bit ordering supported
28-29	X'5204'	Unpadded RIDIC Recording Algorithm supported
30-31	X'5505'	Multiple image content supported
32-33	X'A004'	All four orientations supported
34-35	X'F301'	Scale-to-fill mapping supported

IO Image Command Set (IOCA FS45)

Offset	Range	Meaning
0-1	X'001C'	VECTOR LENGTH
2-3	X'C9D6'	IO Image Command Set
4-5	X'FF45'	IO/1 Level
6-7	X'1001'	Unordered Image Blocks
8-9	X'1202'	IO Image Objects Downloaded Resources in Home State
10-11	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
12-13	X'4401'	Extended IOCA Bi-level Image Color supported
14-15	X'4402'	Extended IOCA Tile-Set Color support
16-17	X'5020'	Solid Rectangle Fill support
18-19	X'5101'	Bit ordering supported
20-21	X'5204'	Unpadded RIDIC Recording Algorithm supported
22-23	X'5505'	Multiple image Content supported
24-25	X'A004'	All four orientations supported

Offset	Range	Meaning
26-27	X'F301'	Scale-to-fill mapping supported

Graphics Command Set

Offset	Range	Meaning
0-1	X'001A'	VECTOR LENGTH
2-3	X'E5C7'	GRAPHICS Command Set - GR1 Subset
4-5	X'FF30'	GRS3 Data
6-7	X'1001'	UNORDERED GRAPHICS BLOCKS
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'4100'	Set Process Color Supported
12-13	X'4101'	GOCA Box Drawing Supported
14-15	X'4102'	Partial Arc Drawing Supported
16-17	X'4106'	Set Fractional Line Width Supported
18-19	X'4108'	Normal line width default
20-21	X'4109'	Process Color default
22-23	X'4112'	Clockwise partial arc
24-25	X'A004'	All 4 orientations supported

Page Segment Command Set

Offset	Range	Meaning
0-1	X'0008'	VECTOR LENGTH
2-3	X'D7E2'	PAGE SEGMENT Command Set
4-5	X'FF10'	PS1 Subset

Offset	Range	Meaning
6-7	X'1101'	EXTENDED PAGE SEGMENT SUPPORT (32K)

Overlay Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'D6D3'	OVERLAY Command Set
4-5	X'FF10'	OL1 Subset
6-7	X'1506'	OVERLAY NESTING = 6 Levels
8-9	X'1102'	EXTENDED OVERLAY SUPPORT (32K)
10-11	X'A004'	page-overlay-rotation support; all 4 orientations

Loaded Font Command Set (LF1) - Single Byte

Offset	Range	Meaning
0-1	X'0010'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF10'	LF1 subset - fully described font + font index
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B002'	LFI UNDERSCORE Width and Position USED
10-11	X'C005'	BOUNDED BOX RASTER FONT TECHNOLOGY
12-13	X'C100'	FIXED METRICS
14-15	X'C101'	RELATIVE METRICS

Loaded Font Command Set (LF1) - Double Byte

Offset	Range	Meaning
0-1	X'0012'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set

Offset	Range	Meaning
4-5	X'FF10'	LF1 subset - fully described font + font index
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B001'	Double-Byte coded fonts supported
10-11	X'B002'	LFI UNDERSCORE Width and Position USED
12-13	X'C005'	BOUNDED BOX RASTER FONT TECHNOLOGY
14-15	X'C100'	FIXED METRICS
16-17	X'C101'	RELATIVE METRICS

Loaded Font Command Set (LF3) - Single Byte

Offset	Range	Meaning
0-1	X'0014'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF30'	LF3 subset - code page + font character set
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B002'	LFI UNDERSCORE Width and Position USED
10-11	X'B003'	GRID PARTS REQUIRED IN LFC, LFCSC and LCPC COMMANDS
12-13	X'B004'	Default Character Parameters in LCPC Supported
14-15	X'B005'	Extended (Unicode mapping) code page support
16-17	X'C01F'	ADOBE TYPE-1 PFB OUTLINE FONT TECHNOLOGY
18-19	X'C101'	RELATIVE METRICS

Loaded Font Command Set (LF3) - Double Byte

Offset	Range	Meaning
0-1	X'0018'	VECTOR LENGTH
2-3	X'C3C6'	LOADED FONT Command Set
4-5	X'FF30'	LF3 subset - code page + font character set

Offset	Range	Meaning
6-7	X'A004'	4 CHARACTER ROTATIONS (LFI command)
8-9	X'B001'	Double-Byte coded fonts supported
10-11	X'B002'	LFI UNDERSCORE Width and Position USED
12-13	X'B003'	GRID PARTS REQUIRED IN LFC, LFCSC and LCPC COMMANDS
14-15	X'B004'	Default Character Parameters in LCPC Supported
16-17	X'B005'	Extended (Unicode mapping) code page support
18-19	X'C01E'	CID-keyed OUTLINE FONT TECHNOLOGY
20-21	X'C01F'	ADOBE TYPE-1 PFB OUTLINE FONT TECHNOLOGY
22-23	X'C101'	RELATIVE METRICS

Bar Code Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'C2C3'	BAR CODE Command Set - BC1 Subset
4-5	X'FF20'	BCD2 Data
6-7	X'1001'	UNORDERED BAR CODE BLOCKS
8-9	X'4022'	COLOR of MEDIUM SUPPORTED LIMITED SIMULATED COLOR SUPPORTED For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.
10-11	X'A004'	All four orientations supported

Note

- See page 179 "Bar Code Type and Modifier Description and Values" for a list of supported Bar Code Types.

Object Container Command Set

Offset	Range	Meaning
0-1	X'000C'	VECTOR LENGTH
2-3	X'D6C3'	Object Container Command set - OC1 Subset
4-5	X'0000'	No levels defined
6-7	X'1201'	Data-object resource support
8-9	X'F301'	Scale-to-fill mapping supported
10-11	X'5800'	Image resolution triplet supported

Execute Order Any State (XOA)

This command identifies a set of subcommands which take effect immediately, regardless of the current printer operating state.

Each Execute Order Any state command consists of a two-byte order code followed by zero or more bytes of parameters.

XOA Mark Form

The MF order causes the printer to place two rectangular blocks of job separation marks on the current or the next sheet. One block is printed on the leading edge of the sheet and one block is printed on the trailing edge of the sheet.

If the MF order is included in a page that is part of a Load Copy Control copy group (See page 28 "Load Copy Control") all the copies of the page will have a job separator mark included.

Offset	Range	Meaning	Error Code
0-1	X'0800'	MARK FORM	

XOA Exception Handling Control

The Exception-Handling Control command allows the host to control how the printer reports and processes exceptions. A data-stream exception exists when the printer detects an invalid or unsupported command, control, or parameter value.

Offset	Range	Meaning	Error Code
0-1	X'F600'	EXCEPTION HANDLING CONTROL (EHC)	

Offset	Range	Meaning	Error Code
2		EXCEPTION REPORTING	
	Bit 0: 0	Do not Report Undefined Character Check	
	Bit 0: 1	Report Undefined Character Check	
	Bit 1: 0	Do not Report Page Position Check	
	Bit 1: 1	Report Page Position Check	
	Bits 2-5: 00	Reserved	
	Bit 6: 0	Do not Highlight Position Checks	
	Bit 6: 1	Highlight Position Checks (08C1..00 and 0411..00)	
	Bit 7: 0	Do not Report All other Exceptions with AEA's	
	Bit 7: 1	Report All other Exceptions with AEA's	
3		ALTERNATE EXCEPTION ACTIONS	
	Bits 0-6: 0	Reserved	
	Bit 7: 0	Take AEA (if defined)	
	Bit 7: 1	Don't take AEA	
4		EXCEPTION PRESENTATION PROCESSING	
	Bits 0-5: 0	Reserved	
	Bit 6: 0	No Page Continuation	
	Bit 6: 1	Page Continuation Action (Independent Exception Page Print Supported) Discard Page	
	Bit 7: 0	Print to point of Exception	
	Bit 7: 1	(Process limits may apply) Independent Exception Page Print is only present in Native mode, not 4028 Emulation mode.	

XOA Request Resource List

This order causes the Resource List (See "Resource List Reply") to be placed in the Special Data Area of the Acknowledge Reply (See page 10 "Acknowledgement Reply") requested with this order. If the ARQ flag was not set for this XOA subcommand, it is treated as a NOP.

A Resource List Reply may consist of multiple entries. If the Resource List Reply contains an entry that does not fit in the space available in the Special Data Area of Acknowledge Reply, the printer will follow either the acknowledge continuation method or the RRL-continuation method, depending on the host, as described in Intelligent Printer Data Stream Reference.

Offset	Range	Meaning	Error Code
0-1	X'F400'	REQUEST RESOURCE LIST (RRL)	
2		QUERY TYPE	X'0291..02'
	X'05'	Resource Activation Status	
	X'00' or X'FF'	General Resource Status	
3-4	X'0000'-X'FFFF'	ENTRY CONTINUATION Indicator	
5	X'03'-X'xx'	ENTRY LENGTH Multiple-entry queries are not supported. Byte 5 indicates the length of the command.	X'0291..02'

Offset	Range	Meaning	Error Code
6		RESOURCE TYPE	X'0291..02'
	X'01'	Single Byte Coded Fonts	
	X'02'	Double-byte LF1–type Coded Fonts	
	X'03'	Double-byte LF1–type Coded Font Sections	
	X'04'	Page Segments	
	X'05'	Overlays	
	X'06'	Device Version Code Pages	
	X'07'	Font Character Sets	
	X'08'	Single-byte coded-font indexes	
	X'09'	Double-byte LF1–type Coded Font Section Indexes	
	X'10'	Coded Fonts (treated as RT 01)	
	X'11'	Graphic Character Sets supported in a font character set	
	X'12'	Specific Code Pages	
	X'41'	Data-object font	
	X'42'	Data-object font component	
	X'40'	Data Object Resource	
	X'FF'	All Resources	
7		RESOURCE ID FORMAT	X'0291..02'
	X'00'	Host-Assigned Resource ID	
	X'03'	IBM Registered Global Resource ID parts	
	X'09'	Object-OID	
8-n		RESOURCE IDENTIFIER	

- Multiple-entry queries are not supported. Byte 5 indicates the length of the command.
- If the entire resource list does not fit in the Special Data area of the Acknowledge Reply, continuation is necessary. The printer indicates continuation using the acknowledgement

continuation bit in the flag byte of the Acknowledge Reply. If the host requests Acknowledgement continuation by sending a command with ARQ bit and the Continuation bit set, the printer will complete the RRL reply using Acknowledgement continuation. If the host requests RRL continuation (by sending an RRL command with non-zero value in bytes 3 and 4) the printer will use conventional RRL continuation to finish the reply. If the host requests both RRL and ACK continuation, the printer will default to RRL continuation.

- Bytes 8 and 9 are ignored when the resource type is ALL.
- Exception ID 0291..02 in bytes 6 and 7 are for invalid values. If either value is unsupported, then the query is not understood and the reply is a single entry that sets the resource type to zero, echoes other values, and sets the resource size to zero (not present).

Resource List Reply

Offset	Range	Meaning	Error Code
0	X'FF	UNORDERED LIST	
1	X'01'	END of LIST	
	X'04' - X'nn'	LENGTH of this ENTRY	

Offset	Range	Meaning	Error Code
2		RESOURCE TYPE	
	X'00'	Resource Size=0. The queried Resource Type,ID Format, or ID is unknown, unsupported, or inconsistent	
	X'01'	Single Byte Coded Font	
	X'02'	Double Byte Coded Fonts	
	X'03'	Double Byte Coded-font Sections	
	X'04'	Page Segment	
	X'05'	Overlay	
	X'06'	Device Version Code Pages	
	X'07'	Font Character Sets	
	X'08'	Single Byte Coded Font Index	
	X'09'	Double Byte Coded-font Section Indexes	
	X'11'	Graphic Character Sets supported in a font character set	
	X'12'	Specific Code Pages	
	X'41'	Data-object font	
	X'42'	Data-object font component	
	X'FF'	All Resources	
3		RESOURCE ID FORMAT	
	X'00'	Host-Assigned Resource ID	
	X'03'	IBM Registered Global Resource ID parts	
4		RESOURCE SIZE Indicator	
	X'00'	Resource not present	
	X'01'	Resource present	
5-6	X'xxxx'	Resource ID	

- Bytes 2-6 repeat for each resource type.
- A query for a HARID that maps to a GCSGID/CPGID/FGID/FW combination which is not supported in the current configuration will result in a negative response (Reply Byte 4 = 0).
- For details about a description of the supported GCSGID/CPGID/FGID/FW combinations, see "Code Page and Font Identification", IPDS Technical Reference 1.

Execute Order Home State (XOH)

Each Execute Order Homestate command consists of a two-byte order code followed by zero or more bytes of parameters.

XOH Obtain Printer Characteristics

This order causes a set of self-defined fields describing printer characteristics to be placed in the Special Data Area of the requested Acknowledge Reply and is identified with an acknowledgement type of X'46'. If the ARQ flag was not set on the XOH command containing this order, then this order is equivalent to a No Operation.

Offset	Range	Meaning	Error Code
0-1	X'F300'	OPC Order Code	

Printable Area Self-Defining Field

- The printer provides two modes that determine the specification of the Xm Offset, Ym Offset, Xm Extent and Ym Extent of the Printable Area.
  - Restricted (No Print Border) (Guaranteed Print Legibility) (Default)
  - Unrestricted (Edge-to-Edge Addressability)
- The Xm Extent and Ym Extent of the Printable Area parameters documented in the following table are representative of the standard printer source media configuration. These extents can be modified as a result of receiving a XOHSMO command, as described in page 101 "XOH Set Media Origin".
- Actual tray capacities are determined media weight. The capacities in the following table are the maximum allowable.
- The machine supports media source tray numbering. Media source values in the printer's control panel OPC support tables represent the default settings when the printer is initially installed. An the menu mode is provided to allow customers to specify the source tray numbers to meet requirements of legacy applications. Example: customer might want to address the Manual Tray as tray 4 instead of the tray 100 (default).

Note

- For the tray in which "envelope" has been specified as the paper type, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8040', X'8041', etc. If a different paper type is specified for the tray, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8000', X'8001', etc. In regards to the bypass

tray and default tray, even if you specify "envelope" as the paper type, the tray value will not be changed.

Offset	Range	Meaning
0-1		LENGTH of this Self-Defining Field
	X'0018' or	Machine with NO Media OID
	X'0024' or	Machine with Single Media OID
	X'0025' or	Machine with Double Media OID
	X'0026' or	Machine with Triple Media OID
	X'0027' or	Machine with Quadruple Media OID
	X'nnnn'	Machine with Media Name
2-3	X'0001'	PRINTABLE AREA Self-Defining Field ID

Offset	Range	Meaning
4		INPUT MEDIA SOURCE
	X'00'	Tray 1
		Tray 2
	X'00'	Tray 1 (Paper type: Envelope) + Tray 2 + Bypass Tray Tray 1 (Paper type: Envelope) + Tray 2 + Tray 3 + Bypass tray Tray 1 (Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray
	X'01'	Tray 1 + Tray 2 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray
		Tray 3
	X'01'	Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Bypass tray Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray
	X'02'	Tray 1 + Tray 2 + Tray 3 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray
		Tray 4
	X'02'	Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray
	X'03'	Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray
	X'63'	Bypass tray
	X'FF'	Default tray
	X'00'	Reserved
6	X'00'	UNIT BASE 10 in.
7	X'00'	Reserved
8-9	X'3840'	L-units per UNIT BASE
10-11	X'0001' - X'xxxx'	WIDTH of the Medium Presentation Space in L-units (determined by configuration)
12-13	X'0001' - X'xxxx'	LENGTH of the Medium Presentation Space in L-units (determined by configuration)

Offset	Range	Meaning
14-15		Xm OFFSET of the Printable Area in L-Units
	X'00E3'	Restricted (4mm)
	X'0000'	Unrestricted (0mm)
16-17		Ym OFFSET of the Printable Area in L-units
	X'00E3'	Restricted (4mm)
	X'0000'	Unrestricted (0mm) For A4 media there is special processing with respect to reporting the Xm OFFSET and subsequentially the Xm EXTENT of the printable area. The 4028 printer used an offset of 3.386 mm for A4 paper (short edge) instead of 4 mm. This was done as a customer satisfaction issue to allow a printable area 8 in. wide.

Offset	Range	Meaning
18-19 (Restricted: No Print Border)		Xm EXTENT of the Printable Area in L-units
		Paper
	X'1D2A'	Statement (5.185 in.)
	X'2702'	Executive (6.935 in.)
	X'2B3A'	8in. × 10in. (7.685 in.)
	X'2E0A'	Letter (8.185 in.)
	X'30DA'	Letter Tabstock (8.685 in.)
	X'2B3A'	8in. × 13in. (7.685 in.)
	X'2CA2'	8.25in. × 13in. (7.935 in.)
	X'2E0A'	8.5 × 13 in. (8.185 in.)
	X'2E0A'	Legal (8.185 in.)
	X'367A'	10in. × 14in. (9.685 in.)
	X'367A'	10in. × 15in. (9.685 in.)
	X'3C1A'	11in. × 14in. (10.685 in.)
	X'3C1A'	11in. × 15in. (10.685 in.)
	X'3C1A'	Ledger (10.685 in.)
	X'41BA'	12in. × 18in. (11.685 in.)
	X'157B'	A6 (97 mm)
	X'1A93'	B6 (120 mm)
	X'1F1D'	A5 (140.5 mm)
	X'23E0'	170 × 210mm (162 mm)
	X'2689'	182 × 210mm (174 mm)
	X'2CBC'	210 × 340mm (202 mm)

Offset	Range	Meaning
18-19 (Restricted: No Print Border)	X'2688'	B5 (JIS) (174 mm)
	X'2CBC'	A4 (202 mm)
	X'2F86'	A4 Tabstock (214.6 mm)
	X'3724'	B4 (ISO) (249 mm)
	X'395C'	8 Kai (259 mm)
	X'296A'	16 Kai (187 mm)
	X'4000'	A3 (289 mm)
	X'145F' - X'474F'	Custom (92 mm to 322 mm)
		Transparencies/Labels
	X'2E0A'	Letter (8.185 in.)
	X'2CBC'	A4 (202 mm)

Offset	Range	Meaning
18-19 (Unrestricted: Edge-to-Edge Addressability)		Xm EXTENT of the Printable Area in L-units
		Paper
	X'1EF0'	Statement (5.5 in.)
	X'28C8'	Executive (7.25 in.)
	X'2D00'	8in. × 10in. (8 in.)
	X'2FD0'	Letter (8.5 in.)
	X'32A0'	Letter Tabstock (9 in.)
	X'2D00'	8in. × 13in. (8 in.)
	X'2E68'	8.25in. × 13in. (8.25 in.)
	X'2FD0'	8.5in. × 13in. (8.5 in.)
	X'2FD0'	Legal (8.5 in.)
	X'3840'	10in. × 14in. (10 in.)
	X'3840'	10in. × 15in. (10 in.)
	X'3DE0'	11in. × 14in. (11 in.)
	X'3DE0'	11in. × 15in. (11 in.)
	X'3DE0'	Ledger (11 in.)
	X'4380'	12in. × 18in. (12 in.)
	X'1741'	A6 (105 mm)
	X'1C59'	B6 (128 mm)
	X'20E3'	A5 (148.5 mm)
	X'25A6'	170 × 210mm (170 mm)
	X'284E'	182 × 210mm (182 mm)
	X'2E82'	210 × 340mm (210 mm)

Offset	Range	Meaning
18-19 (Unrestricted: Edge-to-Edge Addressability)	X'284E'	B5 (JIS) (182 mm)
	X'2E82'	A4 (210 mm)
	X'314C'	A4 Tabstock (222.6 mm
	X'38EA'	B4 (ISO) (257 mm)
	X'3B21'	8 Kai (267 mm)
	X'2B30'	16 Kai (195 mm)
	X'41C6'	A3 (297 mm)
	X'1625' - X'4914'	Custom (100 mm to 330 mm)
		Transparencies/Labels
	X'2FD0'	Letter (8.5 in.)
	X'2E82'	A4 (210 mm)

Offset	Range	Meaning
20-21 (Restricted: No Print Border)		Ym EXTENT of the Printable Area in L-units
		Paper
	X'2E0A'	Statement (8.185 in.)
	X'394A'	Executive (10.185 in.)
	X'367A'	8in. × 10in. (9.685 in.)
	X'394A'	8in. × 10.5in. (10.185 in.)
	X'3C1A'	Letter (10.685 in.)
	X'3C1A'	Letter Tabstock (10.685 in.)
	X'475A'	8in. × 13in. (12.685 in.)
	X'475A'	8.25in. × 13in. (12.685 in.)
	X'475A'	8.5in. × 13in. (12.685 in.)
	X'4CFA'	Legal (13.685 in.)
	X'4CFA'	10in. × 14in. (13.685 in.)
	X'529A'	10in. × 15in. (14.685 in.)
	X'4CFA'	11in. × 14in. (13.685 in.)
	X'529A'	11in. × 15in. (14.685 in.)
	X'5DDA'	Ledger (16.685 in.)
	X'637A'	12in. × 18in. (17.685 in.)
	X'1F1D'	A6 (140.5 mm)
	X'2689'	B6 (174 mm)
	X'2CBC'	A5 (202 mm)
	X'2CBC'	170 × 210mm (202 mm)
	X'2CBC'	182 × 210mm (202 mm)
	X'4986'	210 × 340mm (332 mm)

Offset	Range	Meaning
20-21 (Restricted: No Print Border)	X'3724'	B5 (JIS) (249 mm)
	X'4000	A4 (289 mm)
	X'4000'	A4 Tabstock (289 mm)
	X'4ED6'	B4 (ISO) (356 mm)
	X'5499'	8 Kai (382 mm)
	X'395C'	16 Kai (259 mm)
	X'5B3D'	A3 (412 mm)
	X'1D02 - 63A8'	Custom (131 mm to 450 mm)
		Transparencies/Labels
	X'3C1A'	Letter (10.685 in.)
	X'4000'	A4 (289 mm)

Offset	Range	Meaning
20-21(Unrestricted: Edge-to-Edge Addressability)		Ym EXTENT of the Printable Area in L-units
		Paper
	X'2FD0'	Statement (8.5 in.)
	X'3B10'	Executive (10.5 in.)
	X'3840'	8in. × 10in. (10 in.)
	X'3DE0'	Letter (11 in.)
	X'3DE0'	Letter Tabstock (11 in.)
	X'4920'	8in. × 13in. (13 in.)
	X'4920'	8.25in. × 13in. (13 in.)
	X'4920'	8.5in. × 13in. (13 in.)
	X'4EC0'	Legal (14 in.)
	X'4EC0'	10in. × 14in. (14 in.)
	X'5460'	10in. × 15in. (15 in.)
	X'4EC0'	11in. × 14in. (14 in.)
	X'5460'	11in. × 15in. (15 in.)
	X'5FA0'	Ledger (17 in.)
	X'20C7'	12in. × 18in. (18 in.)
	X'20E3'	A6 (148.5 mm)
	X'284E'	B6 (182 mm)
	X'2E82'	A5 (210 mm)
	X'2E82'	170 × 210mm (210 mm)
	X'2E82'	182 × 210mm (210 mm)
	X'4B4C'	210 × 340mm (340 mm)

Offset	Range	Meaning
20-21(Unrestricted: Edge-to-Edge Addressability)	X'38EA'	B5 (JIS) (257 mm)
	X'41C6'	A4 (297 mm)
	X'41C6'	A4 Tabstock (297 mm)
	X'509C'	B4 (ISO) (364 mm)
	X'565F'	8 Kai (390 mm)
	X'3B21'	16 Kai (267 mm)
	X'5D03'	A3 (420 mm)
	X'1EC8 - 656D'	Custom (139 mm to 458 mm)
		Transparencies/Labels
	X'3DE0'	Letter (11 in.)
	X'41C6'	A4 (297 mm)
22-23		INPUT MEDIA SOURCE CHARACTERISTICS
	Bit 0: 0/1	0 = No Duplex; 1 = Duplex
	Bits 1-2: 10	10 = Cut Sheet Media
	Bit 3: 1	0 = Tray Not Available; 1 = Tray Available
	Bit 4: 0	0 = Reserved
	Bit 5: 0/1	0 = No Envelopes; 1 = Auto or Manual Envelope Feature
	Bit 6: 0/1	0 = Auto Media Feed; 1 = Manual Media Feed
	Bit 7: 0	0 = No Computer Output on Microfilm (COM)
	Bit 8: 0	0 = No Carrier Strips (Ignored for Cut Sheet Media)
	Bit 9: 0/1	0 = Not an Inserter Bin; 1 = Inserter Bin
	Bits 10-15:all 0	Reserved

Offset	Range	Meaning
24-25		Input Media ID LENGTH (Note 3)
	X'000C' or	Machine with Single OID byte
	X'000D' or	Machine with Double OID byte
	X'000E' or	Machine with Triple OID byte
	X'000F'	Machine with Quadruple OID byte
26		INPUT MEDIA ID Type
	X'10'	MO:DCA Input Media Type OID
27	X'06'	OID Encoding
28		OID LENGTH
	X'07' or	Machine with Single OID byte
	X'08' or	Machine with Double OID bytes
	X'09' or	Machine with Triple OID bytes
	X'0A'	Machine with Quadruple OID bytes
29-34	X'2B1200 040301'	Input Media ID (Common Part)

Offset	Range	Meaning
35-36		Input Media ID (Media Specific Part)
		Paper
	X'45'	Statement (69)
	X'41'	Executive (65)
	X'8120'	8in. × 10in. (160)
	X'32'	Letter (50)
	X'33'	Letter Colored (51)
	X'34'	Letter Transparent (52)
	X'8111'	Letter Tabstock (9×11) (145)
	No OID Returned	8in. × 13in.
	No OID Returned	8.25in. × 13in.
	X'3F'	8.5in. × 13in. (63)
	X'3C'	Legal (60)
	X'3D'	Legal Colored (61)
	No OID Returned	10in. × 14in.
	No OID Returned	10in. × 15in.
	No OID Returned	11in. × 14in.
	No OID Returned	11in. × 15in.
	X'43'	Ledger (67)

Offset	Range	Meaning
35-36	X'9B'	12in. × 18in. (155)
	No OID Returned	A6
	No OID Returned	B6
	X'14'	A5 (20)
	X'15'	A5 Colored (21)
	No OID Returned	170 × 210mm\
	No OID Returned	182 × 210mm
	No OID Returned	210 × 340mm
	X'2B'	B5 (JIS) (43)
	X'00'	A4 (0)
	X'01'	A4 Colored (1)
	X'02'	A4 Transparent (2)
	X'07'	A4 Tabstock (7)
	X'1E'	B4 (ISO) (30)
	X'1F'	B4 Colored (ISO) (31)
	No OID Returned	8 Kai
	No OID Returned	16 Kai
	X'0A'	A3 (10)
	X'0B'	A3 Colored (11)
	No OID Returned	Custom

Offset	Range	Meaning
37-38	X'0004' - X'0013'	Input Media ID LENGTH (Note 4)
Byte 39		Input Media ID TYPE
	X'00'	User Defined Name
40-end		Input Media ID (Form Name)
	X'4C6574746572'(ie. Letter)	(1 to 16 Byte Form Name)

*1 Available values vary depending on the installed option.

- In the OPC Acknowledge Reply, the Printable Area SDF repeats for every installed Media Source. Therefore, since printers are capable of supporting multiple installed input trays, multiple Printable Area SDF's may be returned in a single XOH-OPC Acknowledge Reply.
- The Input Media Source Characteristics (Bit 0), of the Printable Area SDF indicates the duplex ability of a given media source. See "Media Source and Destination Support Matrices", for specific details on media duplex ability.
- Input Media ID type X'06' - Media OID is only returned if a particular media has a registered MO:DCA Media Type OID.
- Input Media ID type X'00' - User Defined Name is only returned if the user defines a Form, assigns a Form Name to the Form and associates that Form with a given Input Media Source tray.

Image and Coded Font Resolution Self-Defining Field

Offset	Range	Meaning
0-1	X'000A'	LENGTH of this Self-Defining Field
2-3	X'0003'	IMAGE and CODED FONT RESOLUTION Self-Defining Field
4	X'00'	UNIT BASE 10 inches
5		FONT RESOLUTIONS
	X'00'	Resolution Acceptance Mode (Only value in bytes 6-9)
	X'FF'	Resolution Independence Mode (Bytes 6-9 specify highest resolution) (240 DPI or 300 DPI or 600 DPI)

Offset	Range	Meaning
6-7		X PIXELS per Unit Base
	X'0960'	2400 pixels/10 inches
	X'0BB8'	3000 pixels/10 inches
	X'1770'	6000 pixels/10 inches
8-9		Y PIXELS per Unit Base
	X'0960'	2400 pixels/10 inches
	X'0BB8'	3000 pixels/10 inches
	X'1770'	6000 pixels/10 inches

- Value for byte 5 is controlled by the [Resolution] setting in the IPDS menu. Byte 5 will indicate Resolution Acceptance mode X'00' if the IPDS Resolution setting is 240, 300 or 600 DPI. Byte 5 will indicate Resolution Independence mode X'FF' if the IPDS Resolution setting is Auto.
- Values for bytes 6-9 are controlled by the setting of byte 5 (Font Resolutions). If byte 5 indicates Resolution Acceptance mode X'00', bytes 6-9 reflect the [Resolution] setting in the IPDS menu. If byte 5 indicates Resolution Independence mode X'FF', bytes 6-9 reflect the [Print Mode] setting in the IPDS menu. Note that the resolutions specified also apply to GOCA image if the image resolution specified in the GDD command is X'0000', indicating that no explicit GOCA image resolution was specified.
- If the [Print Mode] = STD (Standard 300 DPI), then the [Resolution] setting is ignored. Byte 5 will indicate Resolution Acceptance mode X'00' and bytes 6- 9 will reflect the IPDS Print Mode setting (300 DPI).
- For the printer to specify IPDS Resolution support of 240, 600, or AUTO, the IPDS Print Mode must be set to Enhanced (PRINT MODE = ENH on the IPDS Menu). In enhanced print mode, complex (full page) image jobs may not yield optimal print performance due to the increased print fidelity required to accurately render 240 and 600 DPI print objects.

Storage Pools Self-Defining Field - Single Byte

Offset	Range	Meaning
0-1	X'0033'	VECTOR LENGTH
2-3	X'0004'	STORAGE POOLS Self-Defining Field
4	X'2F'	LENGTH of each Storage Pool Self-Defining Field

Offset	Range	Meaning
5	X'01'	Triplet ID
6	X'00'	STORAGE POOL ID
7-10	X'nnnnnnnn'	Storage pool varies based on installed memory and features
11-14	X'00000000'	Reserved
15-16	X'0011'	PAGE GRAPHICS Data
17-18	X'0012'	PAGE IMAGE Data
19-20	X'0013'	PAGE TEXT Data
21-22	X'0014'	PAGE BAR CODE Data
23-24	X'0021'	OVERLAY GRAPHICS Data
25-26	X'0022'	OVERLAY IMAGE Data
27-28	X'0023'	OVERLAY TEXT Data
29-30	X'0024'	OVERLAY BAR CODE Data
31-32	X'0031'	PAGE SEGMENT GRAPHICS Data
33-34	X'0032'	PAGE SEGMENT IMAGE Data
35-36	X'0033'	PAGE SEGMENT TEXT Data
37-38	X'0034'	PAGE SEGMENT BAR CODE Data
39-40	X'0040'	Single-Byte CODED FONT Index Tables
41-42	X'0041'	Single-Byte CODED FONT Descriptors
43-44	X'0042'	Single-Byte CODED FONT Patterns
45-46	X'0050'	CODE PAGES
47-48	X'0060'	FONT CHARACTER SETS
49-50	X'0070'	CODED FONTS

Storage Pools Self-Defining Field - Double Byte

Offset	Range	Meaning
0-1	X'0039'	VECTOR LENGTH
2-3	X'0004'	STORAGE POOLS Self-Defining Field
4	X'35'	LENGTH of each Storage Pool Self-Defining Field
5	X'01'	Triplet ID
6	X'00'	STORAGE POOL ID
7-10	X'nnnnnnnn'	Storage pool varies based on installed memory and features
11-14	X'00000000'	Reserved
15-16	X'0011'	PAGE GRAPHICS Data
17-18	X'0012'	PAGE IMAGE Data
19-20	X'0013'	PAGE TEXT Data
21-22	X'0014'	PAGE BAR CODE Data
23-24	X'0021'	OVERLAY GRAPHICS Data
25-26	X'0022'	OVERLAY IMAGE Data
27-28	X'0023'	OVERLAY TEXT Data
29-30	X'0024'	OVERLAY BAR CODE Data
31-32	X'0031'	PAGE SEGMENT GRAPHICS Data
33-34	X'0032'	PAGE SEGMENT IMAGE Data
35-36	X'0033'	PAGE SEGMENT TEXT Data
37-38	X'0034'	PAGE SEGMENT BAR CODE Data
39-40	X'0040'	Single-Byte CODED FONT Index Tables
41-42	X'0041'	Single-Byte CODED FONT Descriptors
43-44	X'0042'	Single-Byte CODED FONT Patterns

Offset	Range	Meaning
45-46	X'0048'	Double-Byte CODED FONT Index Tables
47-48	X'0049'	Double-Byte CODED FONT Descriptors
49-50	X'004A'	Double-Byte CODED FONT Patterns
51-52	X'0050'	CODE PAGES
53-54	X'0060'	FONT CHARACTER SETS
55-56	X'0070'	CODED FONTS

Color Support Self-Defining Field

Offset	Range	Meaning
0-1	X'0006'	LENGTH of this Self-Defining Field
2-3	X'0005'	COLOR SUPPORT Self-Defining Field
4-5	X'0008'	BLACK

Installed Features Self-Defining Field

Since printers are capable of supporting multiple features, multiple configuration combinations are possible. All installable features are described below.

Offset	Range	Meaning
0-1	X'000C' or X'000E'	LENGTH of this Self Defining Field
2-3	X'0006'	INSTALLED FEATURES Self Defining Field
4-5	X'0100'	DUPLEX
6-7	X'0300'	CUT SHEET Output
8-9	X'0600'	OFFSET STACKER
10-11	X'0700'	Envelopes
12-13	X'0800'	MICR (If MICR Enabled)

Available Features Self-Defining Field

Since printers are capable of supporting multiple features, multiple configuration combinations are possible. All available features are described below.

Offset	Range	Meaning
0-1	X'000C' or X'000E'	LENGTH of this Self Defining Field
2-3	X'0007'	AVAILABLE FEATURES Self Defining Field
4-5	X'0100'	DUPLEX
6-7	X'0300'	CUT SHEET Output
8-9	X'0600'	OFFSET STACKER
10-11	X'0700'	Envelope
12-13	X'0800'	MICR (If MICR Enabled)

RRL Resource Type and ID Format Self-Defining Field - Single Byte

Offset	Range	Meaning
0-1	X'0022'	VECTOR LENGTH
2-3	X'000A'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See page 64 "XOA Request Resource List")
4-5	X'0100'	Single-Byte Coded Fonts as Host Assigned Resource ID
6-7	X'0103'	Single-Byte Coded Fonts as IBM Global Resource ID
8-9	X'0400'	Page Segments as Host Assigned Resource ID
10-11	X'0500'	Overlays as Host Assigned Resource ID
12-13	X'0600'	Device Version Code Pages as Host Assigned Resource ID
14-15	X'0603'	Device Version Code Pages as IBM Global Resource ID
16-17	X'0700'	Font Character Set as Host Assigned Resource ID
18-19	X'0703'	Font Character Set as IBM Global Resource ID

Offset	Range	Meaning
20-21	X'0800'	Single-Byte Coded Font Index as Host Assigned Resource ID
22-23	X'1000'	Coded Fonts as Host Assigned Resource ID
24-25	X'1003'	Coded Fonts as IBM Global Resource ID
26-27	X'1103'	Graphic Character Sets/Subsets as IBM Global Resource ID
28-29	X'1200'	Specific Code Pages as Host Assigned Resource ID
30-31	X'1203'	Specific Code Pages as IBM Global Resource ID
32-33	X'FF00'	All Resources as Host Assigned Resource ID

RRL Resource Type and ID Format Self-Defining Field - Double Byte

Offset	Range	Meaning
0-1	X'0034'	VECTOR LENGTH
2-3	X'000A'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See page 64 "XOA Request Resource List")
4-5	X'0100'	Single-Byte Coded Fonts as Host Assigned Resource ID
6-7	X'0103'	Single-Byte Coded Fonts as IBM Global Resource ID
8-9	X'0200'	Double-Byte Coded LF1 Fonts as Host Assigned Resource ID
10-11	X'0203'	Double-Byte Coded LF1 Fonts as IBM Global Resource ID
12-13	X'0300'	Double-Byte Coded LF1 Font Sect as Host Assigned Resource ID
14-15	X'0400'	Page Segments as Host Assigned Resource ID
16-17	X'0500'	Overlays as Host Assigned Resource ID
18-19	X'0600	Device Version Code Pages as Host Assigned Resource ID
20-21	X'0603'	Device Version Code Pages as IBM Global Resource ID
22-23	X'0700'	Font Character Set as Host Assigned Resource ID
24-25	X'0703'	Font Character Set as IBM Global Resource ID

Offset	Range	Meaning
26-27	X'0800'	Single-Byte Coded Font Index as Host Assigned Resource ID
28-29	X'0900'	Double-Byte Coded Font Sect Index as Host Assigned Resource ID
30-31	X'1000'	Coded Fonts as Host Assigned Resource ID
32-33	X'1003'	Coded Fonts as IBM Global Resource ID
34-35	X'1103'	Graphic Character Sets/Subsets as IBM Global Resource ID
36-37	X'1200'	Specific Code Pages as Host Assigned Resource ID
38-39	X'1203'	Specific Code Pages as IBM Global Resource ID
40-41	X'4000'	Data object resource as Host Assigned Resource ID
42-43	X'4009'	Data object resource with Object-OID Format
44-45	X'4100'	Data-object Font as Host Assigned Resource ID
46-47	X'4200'	Data-object Font Components as Host Assigned Resource ID
48-49	X'4209'	Data-object Font Components with Object- OID Format
50-51	X'FF00'	All Resources as Host Assigned Resource ID

Activate Resource RT and ID Format Self-Defining Field - Single Byte

Offset	Range	Meaning
0-1	X'0014'	VECTOR LENGTH
2-3	X'000B'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See page 64 "XOA Request Resource List")
4-5	X'0103'	Single-Byte Coded LF1 Fonts with IBM Global Resource IDs
6-7	X'0106'	Single-Byte Coded LF1 Fonts with MVS Host Unalterable Remote Font Environment
8-9	X'0603'	Code Pages with IBM Global Resource IDs
10-11	X'0703'	Font Character Sets with IBM Global Resource IDs

Offset	Range	Meaning
12-13	X'0803'	Single-Byte Coded LF1 Font Index as IBM Global Resource ID
14-15	X'0806'	Single-Byte Coded LF1 Fonts Index as MVS Host Unalterable
16-17	X'1003'	Single-Byte/Double-Byte Coded Fonts with IBM Global Resource IDs
18-19	X'1007'	Single-Byte/Double-Byte Coded Fonts with Coded Font Format

Activate Resource RT and ID Format Self-Defining Field - Double Byte

Offset	Range	Meaning
0-1	X'0022'	VECTOR LENGTH
2-3	X'000B'	RRL RESOURCE TYPE Self RRL query combinations that receive a non-zero Resource Type reply (See page 64 "XOA Request Resource List")
4-5	X'0103'	Single-Byte Coded LF1 Fonts with IBM Global Resource IDs
6-7	X'0106'	Single-Byte Coded LF1 Fonts with MVS Host Unalterable Remote Font Environment
8-9	X'0303'	Double-Byte Coded LF1 Font Secs with IBM Global Resource IDs
10-11	X'0306'	Double-Byte Coded LF1 Font Secs with MVS Host Unalterable Remote Font Environment
12-13	X'0603'	Code Pages with IBM Global Resource IDs
14-15	X'0703'	Font Character Sets with IBM Global Resource IDs
16-17	X'0803'	Single-Byte Coded LF1 Fonts Index as IBM Global Resource ID
18-19	X'0806'	Single-Byte Coded LF1 Font Index as MVS Host Unalterable
20-21	X'0903'	Double-Byte Coded LF1 Font Secs Index with IBM Global Resource ID
22-23	X'0906'	Double-Byte Coded LF1 Font Secs with MVS Host Unalterable RMTFE
24-25	X'1003'	Single-Byte/Double-Byte Coded Fonts with IBM Global Resource IDs
26-27	X'1007'	Single-Byte/Double-Byte Coded Fonts with Coded Font Format
28-29	X'4009'	Data object resource with Object-OID Format

Offset	Range	Meaning
30-31	X'410A'	Data-object Font with Data-object Font Format
32-33	X'4209'	Data-object Font Components with Object- OID Format

Bar Code Type Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0013'	VECTOR LENGTH
2-3	X'000E'	BAR CODE TYPE Self Defining Field
4	X'0D'	CODABAR Modifier Byte Options X'01' and X'02'
5	X'11'	CODE 128 Modifier Byte Option X'02'
6	X'18'	POSTNET Modifier Byte Options X'00' - X'03'
7	X'1A'	RM4SCC Modifier Byte Option X'00'
8	X'1B'	Japan Postal Bar code Modifier Byte Options X'00' and '01'
9	X'1C'	Data Matrix 2D Bar Code Modifier Byte Option X'00'
10	X'1D'	MaxiCode 2D Bar Code Modifier Byte Option X'00'
11	X'1E'	PDF417 2D Bar Code Modifier Byte Options X'00' and X'01'
12	X'1F'	Australia Post Bar Code Modifier Byte Options X'01' - X'08'
13	X'9A'	Rm4scc Modifier byte option X'01'
14	X'20'	QR Code 2D Bar Code Modifier Byte Option X'02'
15	X'21'	Code 93 Modifier Byte Option X'00'
16	X'91'	Code 128 Modifier Byte Option X'03'
17	X'98'	POSTNET (PLANET) Modifier Byte Option X'04'
18	X'22'	USPS Four-State Bar Code Modifier Byte Options X'00' through X'03'

Note

- See page 179 "Bar Code Type and Modifier Description and Values" for all Bar Codes supported.

Media-Destinations Self-Defining Field ID

Offset	Range	Meaning
0-1	X'001A'	LENGTH of this Self Defining Field
2-3	X'0010'	Media-Destinations self-defining ID
4-5	X'nnnn'	Default media-destination ID (Determined by Configuration)
6-7	X'0001'	First number in a range of available, contiguous media-destination IDs
8-9	X'nnnn'	Last number in a range of available, contiguous media-destination IDs; this ID must be greater than or equal to the value specified in bytes +0-1 for this set

Supported Group Operations Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0005'	LENGTH of this Self-Defining Field
2-3	X'0012'	SUPPORTED GROUP OPERATIONS Self-Defining Field
4	X'01'	Keep group together as a print unit

Product Identifier Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0053'	LENGTH of this Self Defining Field
2-3	X'0013'	PRODUCT IDENTIFIER Self Defining Field ID
4	X'38'	LENGTH of Self Defining Product ID Parameter
5-6	X'0001'	UNIQUE PRODUCT IDENTIFIER Parameter ID
7-12		DEVICE TYPE
	X'F0F0F0F 7F3F0'	This machine

Offset	Range	Meaning
13-15		DEVICE MODEL
	X'F0F0F0'	This machine
16-18	X'DCC9C8' (RIH)	MANUFACTURER
19-20	X'0000'	PLANT
21-32		SEQUENCE NUMBER (Serial number)
	X'F0F0F0F0F0F0F2F9F6F5F3F8' (ie. 296538)	(EBCDIC) (12 bytes)
33-34	X'0000'	TAG
35-43		IPDS CODE LEVEL
	X'F0F0F0F0F44BF5F3F0' (4.530)	(EBCDIC) (9 bytes)
44-59		CONTROLLER CODE LEVEL
	X'F0F0F0F0F0F0F0F0F0F0F0F0F14BF2F12' (1.21)	(EBCDIC) (16 bytes)
60	X'17'	LENGTH of Self Defining Product ID Parameter
61-62	X'0003'	PRINTER NAME Parameter ID
63-82	X'nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn'	PRINTER NAME

Object Container Type Support Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0148'	LENGTH of this Self Defining Field
2-3	X'0014'	Object Container Type Support Self Defining Field
4	X'82'	length of the Type record
5	X'01'	Type - Page or Overlay State
6-21	X'06072b 1200040 1011600 0000000 00000'	Graphics Interchange Format (GIF)
22–37	X'06072b 1200040 1012F00 0000000 00000'	IOCA Tile Resource
38-53	X'06072b 1200040 1011700 0000000 00000'	JPEG File Interchange Format (JFIF)
54-69	X'06072b 1200040 1010E00 0000000 00000'	Tag Image File Format (TIFF)
70-85	X'06072b 1200040 1013C00 0000000 00000'	TIFF without transparency

Offset	Range	Meaning
86-101	X'06072b 1200040 1013D00 0000000 00000'	TIFF multi-image file with transparency
102-117	X'06072b 1200040 1013E00 0000000 00000'	TIFF multi-image file without transparency
118-133	X'06072b 1200040 1014200 0000000 00000'	AFPC TIFF
134	X'C2'	length of the Type record
135	X'02'	home state Type
136-151	X'06072b 1200040 1011600 0000000 00000'	Graphics Interchange Format (GIF)
152-167	X'06072b 1200040 1012F00 0000000 00000'	IOCA Tile Resource
168-183	X'06072b 1200040 1011700 0000000 00000'	JPEG File Interchange Format (JFIF)

Offset	Range	Meaning
184-199	X'06072b1200401010E000000000000'	Tag Image File Format (TIFF)
200-215	X'06072b1200401013C000000000000'	TIFF without transparency
216-231	X'06072b1200401013D000000000000'	TIFF multi-image file with transparency
232-247	X'06072b1200401013E000000000000'	TIFF multi-image file without transparency
248-263	X'06072b1200401013500000000000'	TrueType/OpenType Collection
264-279	X'06072b1200401013300000000000'	TrueType/OpenType Font
280-295	X'06072b1200401013900000000000'	Color Management Resource

Offset	Range	Meaning
296-311	X'06072b1200401011400000000000000'	Color Mapping Table setup file
312-327	X'06072b1200401014200000000000000'	AFPC TIFF

Device-Appearance Self-Defining Field ID

Offset	Range	Meaning
0-1	X'0006'	LENGTH of this Self Defining Field
2-3	X'0022'	Device appearance Self Defining Field
4-5	X'0001'	Device-default monochrome appearance

PFC Triplets Supported Self Defining Field ID

Offset	Range	Meaning
0-1	X'0008'	LENGTH of this Self Defining Field
2-3	X'0016'	PFC Triplets Supported Self Defining Field
4	X'75'	Color Fidelity Triple
5	X'86'	Text Fidelity Triplet
6	X'88'	Finishing Fidelity Control Triplet
7	X'96'	CMR Tag Fidelity Triplet

XOH Select Input Media Source

This order selects the input media source and, indirectly, the input media, for subsequent physical sheets.

The set of valid values differs according to which forms module configuration is installed and selected by the operator. Since printers are capable of supporting multiple installed input bins, multiple configuration combinations are possible. All input media sources are described below.

When the number of installed input bins changes, the printer is POR'd and initial machine settings are established. When the bin configuration changes exception X'0101..00' is reported to the host.

- Actual tray capacities are determined by media weight. The capacities indicated in the table are the maximum allowable.
- The machine supports media source tray numbering. Media source values in the SIMS support tables represent the default settings when the printer is initially installed. For this machine, the printer's control panel menu mode is provided to allow customers to specify the source tray numbers to meet requirements of legacy applications.

Note

- For the tray in which "envelope" has been specified as the paper type, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8040', X'8041', etc. If a different paper type is specified for the tray, the tray values of the tray ID are (in ascending for each respective tray that is installed) as follows: X'8000', X'8001', etc. In regards to the bypass tray and default tray, even if you specify "envelope" as the paper type, the tray value will not be changed.

Offset	Range	Meaning	Error Code
0-1	X'1500'	SELECT INPUT MEDIA SOURCE	

Offset	Range	Meaning	Error Code
2		INPUT MEDIA SOURCE	X'02C8..01'
	X'00'	Tray 1	
		Tray 2	
	X'00'	Tray 1 (Paper type: Envelope) + Tray 2 + Bypass Tray Tray 1 (Paper type: Envelope) + Tray 2 + Tray 3 + Bypass tray Tray 1 (Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'01'	Tray 1 + Tray 2 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
		Tray 3	
	X'01'	Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Bypass tray Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'02'	Tray 1 + Tray 2 + Tray 3 + Bypass tray Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
		Tray 4	
	X'02'	Tray 1(Paper type: Envelope) + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'03'	Tray 1 + Tray 2 + Tray 3 + Tray 4 + Bypass tray	
	X'63'	Bypass tray	
	X'FF'	Default tray	

*1 Available values vary depending on the installed option.

XOH Set Media Origin

The XOH Set Media Origin (SMO) command specifies the origin of the media.

This order takes effect on the next-received page. The media origin will not change until either another XOH-SMO command is processed or the printer is reinitialized.

Offset	Range	Meaning	Error Code
0-1	X'1600'	SET MEDIA ORIGIN	
2		MEDIA ORIGIN	X'026F..02'
	X'00'	Top-left corner	
	X'01'	Top-right corner (Bottom-left corner if back side of duplex sheet)	
	X'02'	Bottom-right corner	
	X'03'	Bottom-left corner (Top-right corner if back side of duplex sheet)	

XOH Set Media Size

This order specifies SIZE of the physical medium.

Offset	Range	Meaning	Error Code
0-1	X'1700'	Set Media Size (SMS) order code	
2		UNIT BASE (Measurement Units)	X'0274..02'
	X'00'	10 in.	
	X'01'	10 centimeters	
3-4		L-Units per UNIT BASE	X'0270..02'
	X'3840'	14400 L-Units/10 inches	
	X'1626'	5670 L-Units/10 centimeters	
	X'0960'	2400 L-Units/10 inches	
	X'03B1'	945 L-Units/10 centimeters	

Offset	Range	Meaning	Error Code
5-6	X'0001' - X'7FFF'	Xm EXTENT of MEDIUM See "Notation Conventions", IPDS Technical Reference 1.	X'0272..02'
	X'FFFF'	Printer Default (Printer's control panel setting or Tray sensors)	
7-8	X'0001' - X'7FFF'	Ym EXTENT of MEDIUM See "Notation Conventions", IPDS Technical Reference 1.	X'0273..02'
	X'FFFF'	Printer Default (Printer's control panel setting or Tray sensors)	

XOH Page Counter Control

The XOH Page Counter Control (PCC) command provides a counter synchronization function that should only be used to recover from an exception or after a XOA Discard Buffer Data command.

Offset	Range	Meaning	Error Code
0-1	X'F500'	OPC Order Code	
2	X'00'	Do Nothing (default)	
	X'01'	Synchronize Counters	

XOH Define Group Boundary

This order initiates or terminates a grouping of pages. When a grouping of pages is initiated the page that next increments the received page counter is the first sheet in the designated group.

Offset	Range	Meaning	Error Code
0-1	X'0400'	Define Group Boundary	X'018F..00' X'0277..01' X'0278..01' X'027A..01' X'027B..01'
2	X'00'	Initiate Group	
	X'01'	Terminate Group	
3	X'00' - X'FF'	Group Level	
4-end of command	See specific triplet description.	X'00' Group ID triplet	
		X'6E' Group information triplet	X'027C..01'
		X'85' Finishing Operation triplet	X'027C..02'

Group ID Triplet

The Group ID triplet specifies host specific print-data formats for print job identification. The printer utilizes this information to provide IPDS print job identification on the printer console display.

Offset	Range	Meaning	Error Code
0	X'02'-X'FF'	LENGTH	X'027A..01' X'027B..02'
1	X'01'	Group ID Triplet	

Offset	Range	Meaning	Error Code
2		HOST FORMAT	
	X'01'	MVS and VSE print-data	
	X'02'	VM print-data	
	X'03'	OS/400 print-data (4 char spool file #)	
	X'06'	AIX and NT print-data	
	X'13'	OS/400 print-data (6 char spool file #)	
4-11		MVS and VSE ID DATA	
	X'C2E4C4C7C5E3F0F1' (i.e. BUDGET01)	Job Name (EBCDIC) (8 bytes)	
4-11		VM ID DATA	
	X'C2E4C4C7C5E3F0F1' (i.e. BUDGET01)	Filename (EBCDIC) (8 bytes)	
23-32		OS/400 ID DATA	
	X'C2E4C4C7C5E3F2F0F0F1'(i.e. BUDGET2000)	Filename (EBCDIC) (10 bytes)	

Offset	Range	Meaning	Error Code
3-End		AIX and NT ID DATA	
	X'4445505442554447455432303030' (i.e. DEPTBUDGET2000)	Name (ASCII) (1-251 bytes)	

Group Information Triplet

The Group Information is accepted, although no specific processing will occur.

XOH Specify Group Operation

This order indicates to an attached printer, pre-processor, or post-processor that the specified processing option is to be performed upon subsequent boundary groups of the group level identified in this command.

Offset	Range	Meaning	Error Code
0-1	X'0300'	Define Group Boundary	
2	X'00'-X'FF'	Operation Identifier	
	X'01'	Keep group together as a print unit	
	X'04'	Finish	
3	X'00'-X'FF'	Group Level	

Note

- For SGO Identifier (Byte 2), X'01' and X'04' are the only supported operations. All other identifiers are accepted, although no specific processing will occur.

2. Presentation Text Command Set

Presentation Text Commands

Name	Command	Sub-command	Where to Look
Load Equivalence	X'D61D'		page 107 "Load Equivalence"
Write Text	X'D62D'		page 107 "Write Text"

Load Equivalence

This command permits text-suppression values imbedded in text data stored within the printer to be referenced externally using different values. For example, the Internal Suppression value of X'02' may be referenced externally on a Load Copy Control as a X'06' provided that an appropriate Load Equivalence command was previously received.

If more than 127 LE entries are specified, exception X'0202..02' is reported.

Offset	Range	Meaning	Error Code
0-1		MAPPING TYPE	X'02C6..02'
	X'0100'	Suppression Mapping	
2-3	X'0001' - X'00FF'	INTERNAL VALUE from BS..ES Pair	X'02C1..02' X'02C8..02'
4-5	X'0001' - X'007F'	EXTERNAL VALUE from LCC	X'02C8..02'
6-509		Zero or more additional entries analogous to Bytes 2-5	

Write Text

In this Write Text description, references made to pages also apply to overlays and page segments.

The print data is a string of 1-byte code points. To determine the character raster pattern, the printer uses the code point to identify the character metrics obtained from:

- Load Font Index (See page 208 "Load Font Index")
- Load Font Control (See page 203 "Load Font Control")
- Font Local ID (See page 36 "Load Font Equivalence")
- Resident Font Data

When the printer processes a Begin Page, it uses the values from the existing Logical Page Descriptor (See page 40 "Logical Page Descriptor") or Initialization Default (See "IPDS Initialization Defaults", IPDS Technical Reference 1) until it processes one of the following text control sequences:

- Draw B-Axis Rule
- Draw I-Axis Rule
- Set Baseline Increment
- Set Coded Font Local
- Set Extended Text Color
- Set Inline Margin
- Set Intercharacter Adjustment
- Set Text Color
- Set Text Orientation
- Set Variable Space Character Increment
- Temporary Baseline Move

The text control sequence value supersedes the Logical Page Descriptor or Initialization Default value and it remains in effect until it is changed by another text control sequence, or End Page is received.

For a complete description of the following text control sequences see the Presentation Text Object Content Architecture Reference and the Intelligent Printer Data Stream Reference.

Absolute Move Baseline

Absolute Move Baseline Control Sequence moves the baseline coordinate relative to the I-axis of the Presentation Text Space.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		ABSOLUTE MOVE BASELINE	
	X'D2'	Unchained	
	X'D3'	Chained	
4-5	X'0000' - X'7FFF'	DISPLACEMENT (Bc) See "Notation Conventions", IPDS Technical Reference 1.	X'0213..01'

Absolute Move Inline

Absolute Move Inline Control Sequence moves an inline coordinate position relative to the B-axis of the Presentation Text Space.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04'	LENGTH	X'021E..01'
3		ABSOLUTE MOVE INLINE	
	X'C6'	Unchained	
	X'C7'	Chained	
4-5	X'0000' - X'7FFF'	DISPLACEMENT (Ic) See "Notation Conventions", IPDS Technical Reference 1.	X'0214..01'

Begin Line

Begin Line Control Sequence begins a new line.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'02'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		BEGIN LINE	
	X'D8'	Unchained	
	X'D9'	Chained	

Begin Suppression

Begin Suppression Control Sequence marks the beginning of a string of presentation text that may be suppressed from the visible output.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'03'	LENGTH	X'021E..01'
3		BEGIN SUPPRESSION	
	X'F2'	Unchained	
	X'F3'	Chained	
4	X'01' - X'FF'	SUPPRESSION ID	X'0298..01'

Draw B-Axis Rule

Draw B-axis Rule Control Sequence draws a rule in the b-direction.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04' or X'07'	LENGTH	X'021E..01'
3		DRAW B-AXIS RULE	
	X'E6'	Unchained	
	X'E7'	Chained	

Offset	Range	Meaning	Error Code
4-5	X'8000' - X'7FFF'	LENGTH (Bl) See "Notation Conventions", IPDS Technical Reference 1.	
6-7		WIDTH (Bw)	
	X'8000' - X'7FFF'	Printer Default 24/1440 inch	
	X'FFFF'		
8		IGNORED	

Draw I-Axis Rule

Draw I-axis Rule Control Sequence draws a rule in the i-direction.

Table 70. Draw I-Axis Rule

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04' or X'07'	LENGTH	X'021E.. 01'
3		DRAW I-AXIS RULE	
	X'E4'	Unchained	
	X'E5'	Chained	
4-5	X'8000' - X'7FFF'	LENGTH (Il) See "Notation Conventions", IPDS Technical Reference 1.	
6-7		WIDTH (Iw)	
	X'8000' - X'7FFF'	Printer Default 24/1440 inch	
	X'FFFF'		
8		IGNORED	

End Suppression

End Suppression Control Sequence marks the end of a string of presentation text that may be suppressed from the visible output.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'03'	LENGTH	X'021E..01'
3		END SUPPRESSION	
	X'F4'	Unchained	
	X'F5'	Chained	
4	X'01' - X'FF'	SUPPRESSION ID	X'0202..01' X'0204..01' X'0298..01'

No Operation

No Operation Control Sequence has no effect on presentation.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'02' - X'FF'	LENGTH	X'021E..01'
3		NO OPERATION	
	X'F8'	Unchained	
	X'F9'	Chained	
4-255		DATA (Ignored)	

Overstrike

The Overstrike control identifies text that is to be overstruck with a specified character.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'05'	LENGTH	X'021E..01'
3		OVERSTRIKE	
	X'72'	Unchained	
	X'73'	Chained	
4		BYPASS IDENTIFIERS	
	Bits 0-3	Reserved	
	Bit 4: 0	Overstrike white space from RMI	
	Bit 4: 1	Bypass white space from RMI	
	Bit 5: 0	Overstrike white space from AMI	
	Bit 5: 1	Bypass white space from AMI	
	Bit 6: 0	Overstrike white space from Space or Variable Space Character	
	Bit 6: 1	Bypass white space from Space or Variable Space Character	
	Bit 7: 0	BYPASS Treat Bits 0-6 according to their set values	
	Bit 7: 1	NO BYPASS Treat Bits 0-6 as if their values are set to zero	
5		IGNORED	
6	X'00' - X'FF'	OVERSTRIKE CHARACTER	

Relative Move Baseline

Relative Move Baseline Control Sequence moves a baseline coordinate relative to the current baseline coordinate position.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Escape Sequence	
2	X'04'	LENGTH	X'021E..01'
3		RELATIVE MOVE BASELINE	
	X'D4'	Unchained	
	X'D5'	Chained	
4-5	X'8000' - X'7FFF'	INCREMENT (Br) See "Notation Conventions", IPDS Technical Reference 1.	

Relative Move Inline

Relative Move Inline Control Sequence moves the inline coordinate of the presentation position relative to the current inline position.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E..01'
3		RELATIVE MOVE INLINE	
	X'C8'	Unchained	
	X'C9'	Chained	
4-5	X'8000' - X'7FFF'	INCREMENT (Ir) See "Notation Conventions", IPDS Technical Reference 1.	

Repeat String

Repeat String Control Sequence contains a string of coded graphic characters that is repeated on the current line.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	

Offset	Range	Meaning	Error Code
2	X'04' - X'FF'	LENGTH	X'021E..01'
3		REPEAT STRING	
	X'EE'	Unchained	
	X'EF'	Chained	
4-5	X'0000' - X'7FFF'	REPEAT LENGTH (RL)	X0219..01'
6-n		REPEAT DATA	X021F..01'

Set Baseline Increment

Set Baseline Increment Control Sequence specifies the distance to be added to the current baseline coordinate when a Begin Line control sequence is executed.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E..01'
3		SET BASELINE INCREMENT	
	X'D0'	Unchained	
	X'D1'	Chained	
4-5	X'8000' - X'7FFF'	INCREMENT (Bi) See "Notation Conventions", IPDS Technical Reference 1.	
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	

Set Coded Font Local

Set Coded Font Local Control Sequence specifies the character attributes to be used and invokes a coded font.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'03'	LENGTH	X'021E..01'
3		SET CODED FONT LOCAL	
	X'F0'	Unchained	
	X'F1'	Chained	
4		LOCAL FONT ID	
	X'01' - X'FE'	Use LPD value. If no LPD is received, use printer default	X'0218..02'
	X'FF'		X'023F..02'

Set Extended Text Color

The Set Extended Text Color control specifies the color value and defines the color space and encoding for that value. The specified color value is applied to foreground areas of the presentation text space. Foreground areas consist of the following:

- The stroked and filled areas of solid text characters, including overstrike characters. With hollow characters, only the stroked portion of the character is considered foreground.
- The stroked area of a rule.
- The stroked area of an underscore.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'14' - X'16'	LENGTH	X'021E..01'
3		SET EXTENDED TEXT COLOR	
	X'80'	Unchained	
	X'81'	Chained	
4	X'00'	RESERVED	

Offset	Range	Meaning	Error Code
5		COLOR SPACE	X'020E.. 02'
	X'01'	RGB - Limited Simulated Color Support	
	X'04'	CMYK - Limited Simulated Color Support	
	X'06'	HCS - Limited Simulated Color Support	
	X'08'	CIELAB - Limited Simulated Color Support	
	X'40'	Standard OCA - Limited Simulated Color Support	
6-9	X'00000000'	RESERVED	
10		1ST COLOR COMPONENT BITS	X'020E.. 05'
	X'01' - X'08'	(RGB, CMYK, CIELAB)	
	X'10'	(Standard OCA, Highlight)	
11		2ND COLOR COMPONENT BITS	X'020E.. 06'
	X'00' - X'08'	(RGB, CMYK, Highlight, CIELAB)	
12		3RD COLOR COMPONENT BITS	X'020E.. 07'
	X'00' - X'08'	(RGB, CMYK, CIELAB)	
13		4TH COLOR COMPONENT BITS	X'020E.. 08'
	X'00' - X'08'	(CMYK)	

Offset	Range	Meaning	Error Code
14-17		COLOR VALUE	X'020E..03' X'020E..04'
		RGB Color Space	
	X'nn'	Red Intensity	
	X'nn'	Green Intensity	
	X'nn'	Blue Intensity	
		CMYK Color Space	
	X'nn'	Cyan Intensity	
	X'nn'	Magenta Intensity	
	X'nn'	Yellow Intensity	
	X'nn'	Black Intensity	
		Highlight Color Space	
	X'nnnn'	Highlight Color Number	
	X'nn'	Percent Coverage	
	X'nn'	Percent Shading	
		CIELAB Color Space	
	X'nn'	Luminance (L)	
	X'nn'	Chrominance Difference (a)	
	X'nn'	Chrominance Difference (b)	

Offset	Range	Meaning	Error Code
14-17		Standard OCA Color Space	
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue	
	X'0002' or X'FF02	Red	
	X'0003' or X'FF03'	Pink	
	X'0004' or X'FF04'	Green	
	X'0005' or X'FF05'	Turquoise	
	X'0006' or X'FF06'	Yellow	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0010'	Brown	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

Set Inline Margin

Set Inline Margin Control Sequence specifies position of an inline margin.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E.. 01'

Offset	Range	Meaning	Error Code
3		SET INLINE MARGIN	
	X'C0'	Unchained	
	X'C1'	Chained	
4-5	X'0000' - X'7FFF'	DISPLACEMENT (Ia) See "Notation Conventions", IPDS Technical Reference 1.	X'0210..01'
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	

Set Intercharacter Adjustment

Set Intercharacter Adjustment Control Sequence specifies additional increment or decrement between graphic characters.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04' or X'05'	LENGTH	X'021E..01'
3		SET INTERCHARACTER ADJUSTMENT	
	X'C2'	Unchained	
	X'C3'	Chained	
4-5	X'0000' - X'7FFF'	ADJUSTMENT (ica) See "Notation Conventions", IPDS Technical Reference 1.	X'0212..01'
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	
6		DIRECTION	X'0212..01'
	X'00'	Increment Direction	
	X'01'	Decrement Direction	
	X'FF'	Same as X'00'	

Set Text Color

The Set Text Color control specifies the foreground color attribute that selects the color for subsequent text characters.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04' or X'05'	LENGTH	X'021E..01'
3		SET TEXT COLOR	
	X'74'	Unchained	
	X'75'	Chained	

Offset	Range	Meaning	Error Code
4-5		COLOR	X'0258..03'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	
	X'FFFF'	Use LPD color value For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.	
6	X'00' - X'01'	PRECISION	X'0258..03'
	X'FF'	Same as X'00'	

Set Text Orientation

Set Text Orientation Control Sequence establishes i-direction and b-direction for the following presentation text.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'06'	LENGTH	X'021E.. 01'
3		SET TEXT ORIENTATION	
	X'F6'	Unchained	
	X'F7'	Chained	
4-5		I-AXIS ORIENTATION	X'020F.. 01'
	X'0000'	0 degrees (+X direction)	
	X'2D00'	90 degrees (+Y direction)	
	X'5A00'	180 degrees (-X direction)	
	X'8700'	270 degrees (-Y direction)	
	X'FFFF'	Use LPD value. If no LPD is received, use printer default	
6		B-AXIS ORIENTATION	X'020F.. 01'
	X'0000'	0 degrees (+X direction)	
	X'2D00'	90 degrees (+Y direction)	
	X'5A00'	180 degrees (-X direction)	
	X'8700'	270 degrees (-Y direction)	
	X'FFFF''	Use LPD value. If no LPD is received, use printer default	

The permitted combinations are those where the difference between the I-axis orientation and the B-axis orientation are 90 degrees.

```
INLINE-DIRECTION BASELINE-DIRECTION
0 deg. rotation 90 deg. rotation
0 deg. rotation 270 deg. rotation
90 deg. rotation 180 deg. rotation
```

90 deg. rotation 0 deg. rotation
180 deg. rotation 270 deg. rotation
180 deg. rotation 90 deg. rotation
270 deg. rotation 180 deg. rotation
270 deg. rotation 0 deg. rotation

Set Variable Space Character Increment

Set Variable Space Character Increment Control Sequence specifies the increment of a Variable Space Character.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'04'	LENGTH	X'021E..01'
3		SET VARIABLE SPACE CHARACTER INCREMENT	
	X'C4'	Unchained	
	X'C5'	Chained	
4-5	X'0000' - X'7FFF'	INCREMENT (vsi) See "Notation Conventions", IPDS Technical Reference 1.	X'0217..01'
	X'FFFF'	Default Variable Space Increment for Current Font	

Temporary Baseline Move

The Temporary Baseline Move Control Sequence is used to change the position of the sequential baseline without change to the established baseline.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'03' or X'06'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		TEMPORARY MOVE BASELINE	
	X'78'	Unchained	
	X'79'	Chained	
4		DIRECTION	X'0298..03'
	X'00'	Baseline is Unchanged	
	X'01'	Return to Established Baseline	
	X'02'	Shift Baseline away from I-axis (Subscript)	
	X'03'	Shift Baseline toward I-axis (Superscript)	
	X'FF'	Same as X'00'	
5		PRECISION	X'0298..03
	X'00'	Accurate placement and character representation is required using the current font.	
	X'01'	A substitute font with characteristics identical to the current font may be used to simulate baseline shift (superscript/ subscript). The printer accepts this value but treats it as X'00'.	
	X'FF'	Same as X'00'	
6-7	X'0000' - X'7FFF'	TEMPORARY BASELINE INCREMENT See "Notation Conventions", IPDS Technical Reference 1.	X'0298..03'
	X'FFFF'	Half the current baseline increment	

Transparent Data

Transparent Data Control Sequence contains a sequence of coded characters that are presented without a scan for embedded control sequences.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'02' - X'FF'	LENGTH	X'021E..01'

Offset	Range	Meaning	Error Code
3		TRANSPARENT DATA	
	X'DA'	Unchained	
	X'DB'	Chained	
4-255		CHARACTER STRING	

Underscore

The Underscore control sequence identifies text that is to be underscored.

Offset	Range	Meaning	Error Code
0-1	X'2BD3'	TEXT CONTROL Sequence	
2	X'03'	LENGTH	X'021E..01'
3		UNDERSCORE	
	X'76'	Unchained	
	X'77'	Chained	

Offset	Range	Meaning	Error Code
4		BYPASS IDENTIFIERS	
	Bits 0-3	Reserved	
	Bit 4: 0	Underscore white space from Relative Move Inline	
	Bit 4: 1	Bypass white space from Relative Move Inline	
	Bit 5: 0	Underscore white space from Absolute Move Inline	
	Bit 5: 1	Bypass white space from Absolute Move Inline	
	Bit 6: 0	Underscore white space from Space or Variable Space Character	
	Bit 6: 1	Bypass white space from Space or Variable Space Character	
	Bit 7: 0	BYPASS Treat Bits 0-6 according to their set values	
	Bit 7: 1	NO BYPASS Treat Bits 0-6 as if their values are set to zero	
	X'FF'	NO BYPASS in EFFECT	

3. IM Image Command Set

IM Image Commands

Name	Command	Sub-command	Where to Look
Write Image Control	X'D63D'		page 130 "Write Image Control"
Write Image	X'D64D'		page 134 "Write Image"

Write Image Control

The Write Image Control command is the first command in the sequence to send raster image data to the printer. The command contains fields to define the input, scale, and image placement parameters. Several Write Image Control commands may be required to a complete raster image.

Offset	Range	Meaning	Error Code
0-1	X'0001' - X'7FFF'	Pixels per scan line in the output image	X'0242..01' X'0243..01'
2-3	X'0001' - X'7FFF'	Number of scan lines in the output Image	X'0244..01' X'0245..01'
4-5	X'0001' - X'7FFF'	Pixels per scan line in the input image	X'0242..01' X'0243..01'
6-7	X'0001' - X'7FFF'	Number of scan lines in the input image	X'0244..01' X'0245..01'
8	X'00'	Uncompressed input image	X'0246..01'
9	X'00'	One bit per pixel in the input image format	X'0246..01'
10		PIXEL MAGNIFICATION FACTOR	X'0247..01'
	X'01'	No Magnification Factor	
	X'02'	Magnification Factor of 2	
11		SCAN LINE MAGNIFICATION FACTOR	X'0247..01'
	X'01'	No Magnification Factor	
	X'02'	Magnification Factor of 2	

Offset	Range	Meaning	Error Code
12-13		SCAN LINE DIRECTION	X'0248..01'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00	180 degrees	
	X'8700'	270 degrees	
14-15		SCAN LINE SEQUENCE DIRECTION	X'0249..01'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
16		REFERENCE COORDINATE SYSTEM	X'024A..01'
	X'00'	Absolute I, Absolute B	
	X'20'	Absolute I, Relative B	
	X'40'	Relative I, Absolute B	
	X'60'	Relative I, Relative B	
	X'A0'	Xp, Yp	
17-19	X'FF8000' - X'007FFF'	Xp, I or I offset coordinate of the IM image block origin	X'024A..01'
20	X'00'	Reserved	
21-23	X'FF8000' - X'007FFF'	Yp, B or B offset coordinate of the IM image block origin	X'024A..01'

Offset	Range	Meaning	Error Code
24-25		IMAGE COLOR (Named Color)	X'0253..01'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue - Limited Simulated Color Support	
	X'000A'	Orange - Limited Simulated Color Support	
	X'000B'	Purple - Limited Simulated Color Support	
	X'000C'	Dark Green - Limited Simulated Color Support	
	X'000D'	Dark Turquoise - Limited Simulated Color Support	
	X'000E'	Mustard - Limited Simulated Color Support	

Offset	Range	Meaning	Error Code
24-25	X'000F'	Gray - Limited Simulated Color Support	
	X'0010'	X'0010' Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset) For details about color simulation and product support specifics, see "Color Simulation", IPDS Technical Reference 1.	

Write Image

The data is a binary representation of the raster image. In the binary data, a 1-bit represents a colored pixel and a 0-bit represents a pixel left unchanged in the page map. In other words, if a pixel is set black by another block on the page (for example, text), it will not be reset to white if it is written with a 0-bit in the image block. Several Write Image commands may be required to a complete raster image.

An error occurs if the host program sends the End command and the total number of bytes of image data is a different number than specified in the image control record.

Offset	Range	Meaning	Error Code
0-End		Binary RASTER IMAGE	X'026A..01' X'026B..01' X'0264..01'

4. IO Image Command Set

IO Image Commands

Name	Command	Sub-command	Where to Look
Write Image Control 2	X'D63E'		page 136 "Write Image Control 2"
Image Area Position		X'AC6B'	page 136 "Image Area Position"
Image Output Control		X'A66B'	page 137 "Image Output Control"
Image Data Descriptor		X'A6FB'	page 139 "Image Data Descriptor"
Write Image 2	X'D64E'		page 142 "Write Image 2"
Begin Segment		X'70'	page 142 "Begin Segment"
Begin Image Content		X'91'	page 142 "Begin Image Content"
Image Size Parameter		X'94'	page 142 "Image Size Parameter"
Image Encoding Parameter		X'95'	page 143 "Image Encoding Parameter"
Image Data Element Size Parameter		X'96'	page 144 "Image Data Element Size Parameter"
Image Look -up Table ID Parameter		X'97'	page 145 "Image Look-up Table ID Parameter"
Image Data		X'FE92'	page 145 "Image Data"

Name	Command	Sub-command	Where to Look
End Image Content		X'93'	page 146 "End Image Content"
End Segment		X'71'	page 146 "End Segment"

Write Image Control 2

The Write Image Control 2 data consists of three consecutive structured fields:

- Image Area Position Control (IAP)
- Image Output Control (IOC)
- Image Data Descriptor (IDD)

The Write Image Control 2 command and the command sequence that follows defines the image presentation block area on the current page. The parameters of this command define the size, placement and orientation of the image block and establish the parameters required to interpret the image segments.

Positive acknowledgement of image commands in Overlay State or Page Segment State means that the command or command sequence has been accepted for processing, but does not imply that its parameters have been checked in any way.

Image Area Position

This data structured field specifies the position and orientation of the image output area relative to a reference coordinate system. It is a REQUIRED data field in the Write Image Control 2 command.

Offset	Range	Meaning	Error Code
0-1	X'000B' - X'xxxx'	LENGTH of Image Area Position	X'0202..05'
2-3	X'AC6B'	STRUCTURED FIELD ID	X'020B..05'
4-5	X'8000' - X'7FFF'	Image Object Area Origin Xp, I, or Ioffset Coordinate Position See "Notation Conventions", IPDS Technical Reference 1.	
6-7	X'8000 - X'7FFF'	Image Object Area Origin Yp, B, or B-offset Coordinate Position See "Notation Conventions", IPDS Technical Reference 1.	

Offset	Range	Meaning	Error Code
8-9		ORIENTATION OF IMAGE BLOCK	X'0203..05'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
10		COORDINATE REFERENCE SYSTEM	X'0204..05'
	X'00'	Absolute I, absolute B	
	X'20'	Absolute I, relative B	
	X'40'	Relative I, absolute B	
	X'60'	Relative I, relative B	
	X'A0'	Page Xp, Yp	
11-n		Ignored	

Image Output Control

This data structured field specifies the mapping option for the image object. It is an ELECTIVE data field in the Write Image Control 2 command. If this field is omitted, the printer will use the following default values:

Mapping option = X'30' (Position and Trim)

X, Y Offset = 0.

X, Y Extent = Image Presentation Space extent defined by the Image Data Descriptor structured field.

Offset	Range	Meaning	Error Code
0-1	X'0010' - X'xxxx'	LENGTH of Image Output Control	X'0202..05'
2-3	X'A66B'	Structured Field ID	X'020B..05'

Offset	Range	Meaning	Error Code
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5-6	X'0001'-X'7FFF'	L-units per UNIT BASE	X'0206..05'
7-8	X'0001'-X'7FFF'	X extent of IO image block in L-units for Page, Overlay and Page Segment See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
9-10	X'0001'-X'7FFF'	Y extent of IO image block in L-units for Page, Overlay and Page See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
11		MAPPING CONTROL OPTION	X'0208..05'
	X'10'	Scale to fit	
	X'20'	Center and trim	
	X'30'	Position and trim	
	X'41'	Point to pixel	
	X'42'	Point to pixel with double dot	
	X'50'	Replicate and Trim	
12-13	X'8000'-X'7FFF'	X OFFSET L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'
14-15	X'8000'-X'7FFF'	Y OFFSET L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'

Offset	Range	Meaning	Error Code
16-n		IOC Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the IOC command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of IOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Specification", IPDS Technical Reference 1. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the IOC command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of IOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IPDS Technical Reference 1.	

Note

- The Replicate and Trim Mapping Control option is supported only when the IPDS Menu PRINT MODE item is set to ENH (Enhanced 600 dpi).

Image Data Descriptor

This is a REQUIRED data structured field in the Write Image Control 2 command. It specifies parameters that define the image presentation space size and resolution.

Offset	Range	Meaning	Error Code
0-1	X'000F' - X'xxxx'	LENGTH of Image Data Descriptor	X'0202..05'
2-3	X'A6FB'	STRUCTURED FIELD ID	X'020B..05'
4-5	X'0000'	Reserved	

Offset	Range	Meaning	Error Code
6		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
7-8	X'0001'-X'7FFF'	X image points per unit base	X'0206..05'
9-10	X'0001'-X'7FFF'	Y image points per unit base	X'0206..05'
11-12	X'0001'-X'7FFF'	X EXTENT of image presentation space (in image points) See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
13-14	X'0001'-X'7FFF'	Y EXTENT of image presentation space (in image points) See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
15-end of IDD		IOCA SDFs	
0	X'F4'	Set Extended Bilevel Image Color SDF	
	X'F6'	Set Bilevel Image Color SDF *1	
1	X'04'	LENGTH	
2	X'00'	AREA	
3	X'00'	Reserved	

Offset	Range	Meaning	Error Code
4-5		Named Color	
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue - Limited Simulated Color Support	
	X'000A'	Orange - Limited Simulated Color Support	
	X'000B'	Purple - Limited Simulated Color Support	
4-5	X'000C'	Dark Green - Limited Simulated Color Support	
	X'000D'	Dark Turquoise - Limited Simulated Color Support	
	X'000E'	Mustard - Limited Simulated Color Support	
	X'000F'	Gray - Limited Simulated Color Support	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

*1 Refer to the Intelligent Printer Data Stream Reference and the Image Object Content Architecture Reference for specifics on the Set Bilevel Image Color SDF format.

Write Image 2

The image segment is processed as it is received by the printer and is not retained or stored as a named image segment.

Write Image 2 command carries the IO image data within a hierarchical sequence of self-defining fields. See the Intelligent Printer Data Stream Reference and the Image Object Content Architecture Reference.

Begin Segment

Offset	Range	Meaning	Error Code
0	X'70'	Begin Segment	X'0570..0F'
1	X'00'-X'FF'	Length	

Begin Image Content

Offset	Range	Meaning	Error Code
0	X'91'	Begin Image Content	X'0591..0F'
1	X'01'-X'FF'	Length	X'0500..03'
2	X'FF'	Format Specification	X'0500..04'

Image Size Parameter

The Image Size Parameter specifies the size of the image defined within the image segment. Mapping of the image into the image presentation space (See page 139 "Image Data Descriptor") is on a 1 image point to 1 image point basis (one image point of an IO-Image segment is mapped to one image point of the image presentation space).

Offset	Range	Meaning	Error Code
0	X'94'	IMAGE SIZE	X'0594..0F'
1	X'09'-X'FF'	LENGTH of the following bytes	X'0500..03'
2		UNIT BASE (Measurement Units)	
	X'00'	10 Inches	
	X'01'	10 Centimeters	
	X'02'	Logical (resolution ratio)	
3-4	X'0000' - X'7FFF'	X image points per unit base	
5-6	X'0000' - X'7FFF'	Y image points per unit base	
7-8	X'0000'- X'7FFF'	X extent of the image in image points	X'0500..04' X'0594..11' X'0595..11' X'05A9..02'
9-10	X'0000'- X'7FFF'	Y extent of the image in image points	X'0500..04' X'05A9..02'

Image Encoding Parameter

Offset	Range	Meaning	Error Code
0	X'95'	IMAGE ENCODING	X'0595..0F'

Offset	Range	Meaning	Error Code
1	X'02'-X'FF'	LENGTH of the following bytes	X'0500..03'
2		COMPRESSION ALGORITHM	X'0595..10' X'0595..11'
	X'01'	IBM MMR compression	
	X'03'	No compression	
	X'06'	RL4 compression	
	X'08'	ABIC (Bilevel Q-Coder)	
	X'80'	G3 MH (CCITT T.4 facsimile 1-D)	
	X'81'	G3 MR (CCITT T.4 G3 facsimile 2-D)	
	X'82'	G4 MMR (CCITT T.6 G4 facsimile 2-D)	
3		RECORDING ALGORITHM	X'0595..10'
	X'01'	RIDIC (Recording Image Data Inline Code) Unpadded RIDIC	
4		BIT ORDER within each image data byte	
	X'00'	Left-to-Right	
	X'01'	Right-to-Left	

Image Data Element Size Parameter

Offset	Range	Meaning	Error Code
0	X'96'	IMAGE DATA ELEMENT SIZE	X'0596..0F'
1	X'01'-X'FF'	LENGTH of the following bytes	X'0500..03'

Offset	Range	Meaning	Error Code
2		NUMBER of BITS per PIXEL	X'0596..10' X'0500..04' X'0596..11'
	X'01'	1 bit per pixel	
	X'08'	8 bits per pixel	

If 1 is specified, the image is binary, with 1-bit representing black pixels and 0- bit representing pixels unchanged in the page map. If the image is uncompressed, each raster scan in the image data must be padded so that it is an integral number of bytes.

If 8 is specified, the image is gray scale. Each image byte is considered to be a value 0 to 255, where 0 is maximum black, 255 is no black at all, and the values in between are shades of gray.

The printer implements 8 bit per pixel images by halftoning. Halftoning significantly degrades image detail. For that reason, resolutions of gray scale data greater than 120 pixels per inch are not recommended except for draft printing purposes.

If 8 is specified, the Image Compression, if specified with the Image Encoding command, must be uncompressed. This error is detected when the first Image Data command is received.

Image Look-up Table ID Parameter

Offset	Range	Meaning	Error Code
0	X'97'	Image Look-up Table ID Parameter	X'0597..0F'
1	X'01'-X'FF'	LENGTH of the following bytes	X'0500..03'
2	X'00'	Look up table ID	X'0597..10'

Image Data

Offset	Range	Meaning	Error Code
0-1	X'FE92'	Image Data	X'0592..0F'

Offset	Range	Meaning	Error Code
2-3	X'0001'-X'FFFF'	Length	X'0500..03'' X'0594..01'
4-end	X'x...x'	Image Data	X'0597..10'

End Image Content

Offset	Range	Meaning	Error Code
0	X'93'	End Image Content	X'0593..0F'
1	X'00'-X'FF'	Length	

End Segment

Offset	Range	Meaning	Error Code
0	X'71'	End Segment	X'0571..0F'
1	X'00'-X'FF'	Length	

5. Graphics Command Set

Graphics Commands

The base reference for graphic drawing orders is the Graphics Object Content Architecture Reference.

Name	Command	Sub-command	Where to Look
Write Graphics Control	X'D684'		page 147 "Write Graphics Control"
Graphics Area Position		X'AC6B'	page 147 "Graphics Area Position"
Graphics Output Control		X'A66B'	page 148 "Graphics Output Control"
Graphics Data Descriptor		X'A6BB'	page 150 "Graphics Data Descriptor"
Write Graphics	X'D685'		page 155 "Write Graphics"
Begin Segment Introducer		X'70'	page 156 "Begin Segment Introducer"

Write Graphics Control

Graphics Area Position

Offset	Range	Meaning	Error Code
0-1	X'000B'-X'xxxx'	LENGTH of Graphics Area Position	X'0202..05'
2-3	X'AC6B'	Structured Field ID.	X'020B..05'
4-5	X'8000'-X'7FFF'	GRAPHICS BLOCK ORIGIN Xp, I, or I-offset Coordinate Position. See "Notation Conventions", IPDS Technical Reference 1.	

Offset	Range	Meaning	Error Code
6-7	X'8000'-X'7FFF'	GRAPHICS BLOCK ORIGIN Yp, B, or B-offset Coordinate Position. See "Notation Conventions", IPDS Technical Reference 1.	
8-9		ORIENTATION of Graphic Block	X'0203..05'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
10		COORDINATE REFERENCE SYSTEM	X'0204..05'
	X'00'	Absolute I, Absolute B	
	X'20'	Absolute I, Relative B	
	X'40'	Relative I, Absolute B	
	X'60'	Relative I, Relative B	
	X'A0'	Page Xp, Yp	
11-n		Ignored	

Graphics Output Control

Offset	Range	Meaning	Error Code
0-1	X'0010'-X'xxxx'	LENGTH of Graphics Output Control (GOC)	X'0202..05'
2-3	X'A66B'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	

Offset	Range	Meaning	Error Code
5-6	X'0001' - X'7FFF'	L-Units per UNIT BASE	X'0206..05'
7-8	X'0001' - X'7FFF'	X EXTENT of GRAPHICS BLOCK in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
9-10	X'0001' - X'7FFF'	Y EXTENT of GRAPHICS BLOCK in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
11		MAPPING Control Option	X'0208..05'
	X'10'	Scale to Fit	
	X'20'	Center and Trim	
	X'30'	Position and Trim	
12-13	X'8000' - X'7FFF'	X OFFSET L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'
14-15	X'8000' - X'7FFF'	Y OFFSET L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'

Offset	Range	Meaning	Error Code
16-n		GOC Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the GOC command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of GOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Specification", IPDS Technical Reference. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the GOC command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of GOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IPDS Technical Reference 1.	

Note

- The Graphics Output Control Self Defining Field is optional and may be omitted from the WGC command. If the GOC is omitted, the printer uses the following:
  - Mapping Control Option X'30' (Position and Trim)
  - X Offset = 0
  - Y Offset = 0
  - Graphics Block size equals the Graphics Presentation Space Window size which is defined in the Graphics Data Descriptor (GDD) Self Defining Field (See page 150 "Graphics Data Descriptor").

Graphics Data Descriptor

Offset	Range	Meaning	Error Code
0-1	X'001C'-X'xxxx'	LENGTH of Graphics Data Descriptor (GDD)	X'0202..05'

Offset	Range	Meaning	Error Code
2-3	X'A6BB'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5	X'00'	Reserved	
6-7	X'0001' - X'7FFF'	Xg UNITS per UNIT BASE	X'0206..05'
8-9	X'0001' - X'7FFF'	Yg UNITS per UNIT BASE Yg = Xg	X'0206..05'
10-13	X'00000000'	Reserved	
14-15	X'8000'-X'7FFF'	Xg LEFT LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
16-17	X'8000'-X'7FFF'	Xg RIGHT LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
18-19	X'8000'-X'7FFF'	Yg TOP LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
20-21	X'8000'-X'7FFF'	Yg BOTTOM LIMIT of Graphic Presentation Space Window. See "Notation Conventions", IPDS Technical Reference 1.	
22-27	X'000000000000'	Reserved	
28-n		INITIAL GRAPHICS DEFAULTS. See "GDD Initial Graphics Defaults Self Describing Instructions"	

If the image resolution specified in the GDD is X'0000' (indicating that no explicit resolution is specified), then the resolution used is the resolution specified in the OPC's Image and Coded Font Resolution Self-Defining Field.

GDD Initial Graphics Defaults Self Describing Instructions

Offset	Range	Meaning	Error Code
0	X'21'	SET CURRENT DEFAULTS	X'0300..21'
1	X'04'-X'FF'	LENGTH of Data	X'0300..03'
2		SET Byte	X'0300..02'
	X'00'	Drawing Attributes	
	X'01'	Line Attributes	
	X'02'	Character Attributes	
	X'03'	Marker Attributes	
	X'04'	Pattern Attributes	
	X'0B'	Arc Parameters	
3-4		MASK Bytes. See "Graphics Drawing Order Defaults and Masks"	X'0300..03'
5		DEFAULT Byte	X'0300..02'
	X'0F'	Use Standard Default	
	X'8F'	Use the following Data Bytes	X'0300..03'
6-n		Data bytes	X'0300..21'

Note

- See page 156 "Begin Segment Introducer" (Drawing Orders) for valid drawing order defaults.

Graphics Drawing Order Defaults and Masks

Set Byte	Mask Bit	Meaning
X'00'		DRAWING ATTRIBUTES
	0	Color (Named Color)
	1	Foreground Mix
	2	Background Mix
	3-15	Reserved
X'01'		LINE ATTRIBUTES
	0	Line Type
	1	Line Width
	2-15	Reserved
X'02'		CHARACTER ATTRIBUTES
	0	Angle X, Y
	1	Character Cell Size CW, CH
	2	Direction
	3	Precision
	4	Character Set
	5	Shear X, Y
	6-15	Reserved
X'03'		MARKER ATTRIBUTES
	0-2	Reserved
	3	Precision
	4	Marker Set
	5-6	Reserved
	7	Marker Symbol
	8-15	Reserved

Set Byte	Mask Bit	Meaning
X'04'		PATTERN ATTRIBUTES
	0-6	Reserved
	7	Pattern Symbol
	8-15	Reserved
X'0B'		ARC PARAMETERS
	0	P Value
	1	R Value
	2	Q Value
	3	S Value
	4-15	Reserved

Write Graphics

Write Graphics Defaults

The following defaults will be used if not previously defined by page 150 "Graphics Data Descriptor" (Graphics Drawing Order Defaults and Masks). The current value of an attribute is taken into account when the drawing order is received.

Meaning	Range
Color	Black
Line Type	Solid
Line Width	Normal (4 pixel)
Character Cell	10 CPI
Character Set	Courier 10
Character Angle	No Rotation
Character Direction	Left to Right
Marker Symbol	Cross
Pattern Symbol	Solid Shading
Current Position	X,Y = 0,0
Arc Parameters	P=Q=1; R=S=0
Foreground Mix	Overpaint
Background Mix	Leave Alone
Character Precision	Character Precision
Marker Precision	Character Precision
Marker Symbol Set	Resident Set in Printer

Begin Segment Introducer

Offset	Range	Meaning	Error Code
0	X'70'	BEGIN SEGMENT code	
1	X'0C'	LENGTH of the following parameters	X'0370..C1'
2-5		SEGMENT ID (Ignored)	
6	X'00'	Reserved	
7		FLAGS	X'0370..01' X'0370..82'
	Bits 0-2: 00	Reserved	
	Bit 3: 0/1	No Prolog (0); Prolog (1)	
	Bit 4: 0	Reserved	
	Bits 5-6: 00/11	New Segment (reinitialize graphics defaults)/Append Segment (do not reinitialize defaults)	
	Bit 7: 0	Reserved	
8-9	X'0000'-X'FFFF'	Length of this segment (SEGLEN)	
10-13	X'00000000'	Reserved	
14-n		See page 156 "Begin Segment Introducer" (Drawing Orders).	

Drawing Orders

The machine supports all DR2 Drawing Orders and valid data values as defined in the Intelligent Printer Data Stream Reference. The following are those Drawing Orders which define specific data values.

Set Background Mix:

Offset	Range	Meaning	Error Code
0	X'0D'	Order code	

Offset	Range	Meaning	Error Code
1		BACKGROUND MIX ATTRIBUTE	X'0300..04' X'0300..0E'
	X'00'	Drawing default	
	X'05'	Leave Alone	

Set Character Angle:

Offset	Range	Meaning	Error Code
0	X'34'	Order code	
1	X'04'	Length	X'0300..03'
2-3	X'8000' - X'7FFF'	Xg COORDINATE	X'0334..00'
4-5	X'8000' - X'7FFF'	Yg COORDINATE	X'0334..00'

- If Xg = 0 and Yg = 0 then the character angle is 0 degrees (default)
- If Xg > 0 and Yg = 0 then the character angle is 0 degrees
- If Xg = 0 and Yg > 0 then the character angle is 90 degrees
- If Xg < 0 and Yg = 0 then the character angle is 180 degrees
- If Xg = 0 and Yg < 0 then the character angle is 270 degrees

Note

- Exception X'0334..00' applies when both Xg and Yg are non-zero values.

Set Character Precision:

Offset	Range	Meaning	Error Code
0	X'39'	Order code	

Offset	Range	Meaning	Error Code
1		PRECISION TYPE	X'0300..04' X'0300..0E'
	X'00'	Current default	
	X'01'	String Precision	
	X'02'	Character Precision	

Set Character Set:

Offset	Range	Meaning	Error Code
0	X'38'	Order code	
1		LOCAL CHARACTER SET ID	X'03C3..00'
	X'00'	Current default	
	X'01' - X'FE'	Local ID for Character Set	
	X'FF'	Printer Default	

Set Color:

Offset	Range	Meaning	Error Code
0	X'0A'	Order code	

Offset	Range	Meaning	Error Code
1		COLOR	X'0300..04'
	X'00'	Printer Default (Black)	
	X'01'	Blue - Limited Simulated Color Support	
	X'02'	Red - Limited Simulated Color Support	
	X'03'	Pink - Limited Simulated Color Support	
	X'04'	Green - Limited Simulated Color Support	
	X'05'	Turquoise - Limited Simulated Color Support	
	X'06'	Yellow - Limited Simulated Color Support	
	X'07'	Black	
	X'08'	Color of Medium (Reset) For details about color simulation and product support specifics, see "Color Simulation" IPDS Technical Reference 1.	

Set Extended Color:

Offset	Range	Meaning	Error Code
0	X'26'	Order code	
1	X'02'	Length	X'0300..03'

Offset	Range	Meaning	Error Code
2-3		EXTENDED COLOR	X'0300..04'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0009'	Dark Blue - Limited Simulated Color Support\	
	X'000A'	Orange - Limited Simulated Color Support	
	X'000B'	Purple - Limited Simulated Color Support	
	X'000C'	Dark Green - Limited Simulated Color Support	

Offset	Range	Meaning	Error Code
2-3	X'000D'	Dark Turquoise - Limited Simulated Color Support	
	X'000E'	Mustard - Limited Simulated Color Support	
	X'000F'	Gray - Limited Simulated Color Support	
	X'0010'	Brown - Limited Simulated Color Support	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset) For details about color simulation and product support specifics, see "Color Simulation" IPDS Technical Reference 1.	

Set Line Type:

Offset	Range	Meaning	Error Code
0	X'18'	Order code	
1		LINE TYPE	X'0300..04' X'0300..0E'
	X'00'	Current default	
	X'01'	Dotted Line	
	X'02'	Short Dashed Line	
	X'03'	Dashed and Dotted Line	
	X'04'	Double Dotted Line	
	X'05'	Long Dashed Line	
	X'06'	Dashed Double Dotted Line	
	X'07'	Solid Line	
	X'08'	Invisible Line	

Set Fractional Line Width (4028 Emulation Mode):

Offset	Range	Meaning	Error Code
0	X'11'	Order code	
1	X'02'	Length	X'0300..03'
2-3		FRACTIONAL LINE WIDTH	X'0300..04' X'0300..0E'
	X'0000'	Current default	
	X'0001' - X'00FF'	2 Pixels Wide	
	X'0100' - X'017F'	4 Pixels Wide	
	X'0180' - X'01FF'	6 Pixels Wide	
	X'0200' - X'0F7F'	G8-60 Pixels Wide	
	X'0F80' - X'FFFF'	62 Pixels Wide	

Set Fractional Line Width (Native Mode):

Offset	Range	Meaning	Error Code
0	X'11'	Order code	
1	X'02'	Length	X'0300..03'

Offset	Range	Meaning	Error Code
2-3		FRACTIONAL LINE WIDTH	X'0300..04' X'0300..0E'
	X'0000'	Current default	
	X'0001' - X'007F'	1 Pixel Wide	
	X'0080' - X'00BF'	2 Pixels Wide	
	X'00C0' - X'00FF'	3 Pixels Wide	
	X'0100' - X'013F'	4 Pixels Wide	
	X'013F' - X'017F'	5 Pixels Wide	
	X'0180' - X'01BF'	6 Pixels Wide	
	X'01C0' - X'01FF'	7 Pixels Wide	
	X'0200' - X'0F7F'	8-60 Pixels Wide	
	X'0F80' - X'FFFF'	62 Pixels Wide	

Set Line Width:

Offset	Range	Meaning	Error Code
0	X'19'	Order code	

Offset	Range	Meaning	Error Code
1		LINE WIDTH	X'0300..04' X'0300..0E'
	X'00'	Current default	
	X'01' - X'0F'	2-58 Pixels Wide (4 pixels increments)	
	X'10' - X'FF'	62 Pixels Wide	

Set Marker Precision:

Offset	Range	Meaning	Error Code
0	X'3B'	Order code	
1		MARKER PRECISION	X'0300..04' X'0300..0E'
	X'00'	Drawing default	
	X'01'	Character Precision	
	X'02'	Stroke Precision	

Set Mix:

Offset	Range	Meaning	Error Code
0	X'0C'	Order code	
1		MIX ATTRIBUTE	X'0300..04' X'0300..0E'
	X'00'	Drawing default	
	X'02'	Overpaint	

Set Pattern Set:

Offset	Range	Meaning	Error Code
0	X'08'	Order code	

Offset	Range	Meaning	Error Code
1	X'00'	PATTERN SET ID	X'0368..03'

Set Pattern Symbol:

Offset	Range	Meaning	Error Code
0	X'28'	Order code	
1		PATTERN SYMBOL ID	X'0368..04'
	X'00'	Use Current default	
	X'01' - X'08'	Decreasing Density	
	X'09'	Vertical Lines	
	X'0A'	Horizontal Lines	
	X'0B'	Diagonal Lines 1 (Bot L/Top R)	
	X'0C'	Diagonal Lines 2 (Bot L/Top R)	
	X'0D'	Diagonal Lines 1 (Top L/Bot R)	
	X'0E'	Diagonal Lines 2 (Top L/Bot R)	
	X'0F'	No Shading	
	X'10'	Solid Shading	
	X'40'	Blank	

Set Process Color

The Set Process Color control specifies a process color, highlights color or named color that sets the following color attributes to the same value:

- Character color
- Image color
- Line color

- Marker color
- Pattern color

Offset	Range	Meaning	Error Code
0	X'B2'	Order Code	
1	X'12' - X'14'	LENGTH	X'0300..03'
2	X'00'	RESERVED	
3		COLOR SPACE	X'020E..02'
	X'01'	RGB - Limited Simulated Color Support	
	X'04'	CMYK - Limited Simulated Color Support	
	X'06'	HCS - Limited Simulated Color Support	
	X'08'	CIELAB - Limited Simulated Color Support	
	X'40'	Standard OCA - Limited Simulated Color Support	
4-7	X'00000000'	RESERVED	
8		1ST COLOR COMPONENT BITS	X'020E..05'
	X'01' - X'08'	(RGB, CMYK, CIELAB)	
	X'10'	Standard OCA Color Space	
9		2ND COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(RGB, CMYK, Highlight, CIELAB)	
10		3RD COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(RGB, CMYK, CIELAB)	
11		4TH COLOR COMPONENT BITS	X'020E..05'
	X'00' - X'08'	(CMYK)	

Offset	Range	Meaning	Error Code
12-15		COLOR VALUE	X'020E..03' X'020E..04'
		RGB Color Space	
	X'nn'	Red Intensity	
	X'nn'	Green Intensity	
	X'nn'	Blue Intensity	
		CMYK Color Space	
	X'nn'	Cyan Intensity	
	X'nn'	Magenta Intensity	
	X'nn'	Yellow Intensity	
	X'nn'	Black Intensity	
		Highlight Color Space	
	X'nnnn'	Highlight Color Number	
	X'nn'	Percent Coverage	
	X'nn'	Percent Shading	
		CIELAB Color Space	
	X'nn'	Luminance (L)	
	X'nn'	Chrominance Difference (a)	
	X'nn'	Chrominance Difference (b)	
		Standard OCA Color Space	

Offset	Range	Meaning	Error Code
12-15	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue	
	X'0002' or X'FF02'	Red	
	X'0003' or X'FF03'	Pink	
	X'0004' or X'FF04'	Green	
	X'0005' or X'FF05'	Turquoise	
	X'0006' or X'FF06'	Yellow	
	X'0007'	White - Color of Medium (Reset)	
	X'0008'	Black	
	X'0010'	Brown	
	X'FF07'	Printer Default (Black)	
	X'FF08'	Color of Medium (Reset)	

Drawing Order Summary

Zero or more drawing orders follow each Begin Segment Introducer. These drawing orders either specify graphics to be printed or assign drawing attributes.

Given below is a list of the supported drawing orders. Please refer to the AFP GOCA Reference, S544-5498, for complete descriptions of all GOCA drawing orders.

Code	Drawing Order
X'68'	Begin Area
X'D1'	Begin Image

Code	Drawing Order
X'91'	Begin Image at Current Position
X'C0'	Box
X'80'	Box at Current Position
X'C3'	Character String
X'83'	Character String at Current Position
X'01'	Comment
X'60'	End Area
X'93'	End Image
X'3E'	End Prolog
X'71'	End Segment (treated like a No Operation command)
X'C5'	Fillet
X'85'	Fillet at Current Position
X'C7'	Full Arc
X'87'	Full Arc at Current Position
X'92'	Image Data
X'C1'	Line
X'81'	Line at Current Position
X'C2'	Marker
X'82'	Marker at Current Position
X'00'	No Operation
X'E1'	Relative Line
X'E3'	Partial Arc
X'A3'	Partial Arc at Current Position
X'A1'	Relative Line at Current Position
X'04'	Segment Characteristics (treated like a No Operation command)

Code	Drawing Order
X'22'	Set Arc Parameters
X'OD'	Set Background Mix
X'34'	Set Character Angle
X'33'	Set Character Cell
X'3A'	Set Character Direction
X'39'	Set Character Precision
X'38'	Set Character Set
X'35'	Set Character Shear
X'0A'	Set Color
X'21'	Set Current Position
X'26'	Set Extended Color
X'11'	Set Fractional Line Width
X'18'	Set Line Type
X'19'	Set Line Width
X'37'	Set Marker Cell
X'3B'	Set Marker Precision
X'3C'	Set Marker Set
X'29'	Set Marker Symbol
X'0C'	Set Mix
X'08'	Set Pattern Set
X'28'	Set Pattern Symbol
X'43'	Set Pick Identifier (treated like a No Operation command)
X'B2'	Set Process Color

6. Bar Code Command Set

The base reference for Bar Code commands is the Bar Code Object Content Architecture Reference.

Bar Code Commands

Name	Command	Sub-command	Where to Look
Write Bar Code Control	X'D680'		page 172 "Write Bar Code Control"
Bar Code Area Position		X'AC6B'	page 172 "Bar Code Area Position"
Bar Code Output Control		X'A66B'	page 173 "Bar Code Output Control"
Bar Code Data Descriptor		X'A6EB'	page 174 "Bar Code Data Descriptor"
Write Bar Code	X'D681'		page 188 "Write Bar Code"

Write Bar Code Control

Bar Code Area Position

Offset	Range	Meaning	Error Code
0-1	X'000B'-X'xxxx'	LENGTH of Bar Code Area Position (BCAP)	X'0202..05'
2-3	X'AC6B'	STRUCTURED FIELD ID	X'020B..05'
4-5	X'8000'-X'7FFF'	Bar Code BLOCK ORIGIN Xp, I, or IOFFSET coordinate position (in 1440ths)	X'0411..00'
6-7	X'8000'-X'7FFF'	Bar Code BLOCK ORIGIN Yp, B, or B-OFFSET coordinate position (in 1440ths)	X'0411..00'
8-9		ORIENTATION OF Bar Code BLOCK	X'0203..05'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
10		COORDINATE REFERENCE SYSTEM	X'0204..05'
	X'00'	Absolute I, Absolute B	
	X'20'	Absolute I, Relative B	
	X'40'	Relative I, Absolute B	
	X'60'	Relative I, Relative B	
	X'A0'	Page Xp, Yp	
11-n :c		Ignored	

Bar Code Output Control

Offset	Range	Meaning	Error Code
0-1	X'0010'-X'xxxx'	LENGTH of Bar Code Output Control (BCOC)	X'0202..05'
2-3	X'A66B'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5-6	X'0001' - X'7FFF'	L-Units per UNIT BASE	X'0206..05'
7-8	X'0001' - X'7FFF'	X EXTENT of Bar Code BLOCK in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
9-10	X'0001' - X'7FFF'	Y EXTENT of Bar Code BLOCK in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use Load Page Descriptor Value	
11	X'30'	MAPPING CONTROL OPTION (Position)	X'0208..05'
12-13	X'8000' - X'7FFF'	X OFFSET L-units See See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'
14-15	X'8000' - X'7FFF'	Y OFFSET L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0209..05'

Offset	Range	Meaning	Error Code
16-n		Triplets • Color Specification Triplet. This optional triplet can be placed at the end of the BCOC command to specify the foreground color of the object area, before any object data is placed on the object area. Any number of BCOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Color Specification", IPDS Technical Reference. • Presentation Space Reset Mixing Triplet. This optional triplet can be placed at the end of the BCOC command to specify whether or not an object area is reset to the color of medium before any object data is placed on the object area. Any number of BCOC triplets can be received, they are processed in the order received and the resulting color of the object area depends on the last instance of the triplet received. For details, see "Presentation Space Reset Mixing", IPDS Technical Reference 1.	

Bar Code Data Descriptor

Offset	Range	Meaning	Error Code
0-1	X'001B'-X'xxxx'	LENGTH of Bar Code Data Descriptor (BCDD)	X'0202..05'
2-3	X'A6EB'	STRUCTURED FIELD ID	X'020B..05'
4		UNIT BASE (Measurement Units)	X'0205..05'
	X'00'	10 Inches	
	X'01'	10 Centimeters	
5	X'00'	Reserved	
6-7	X'0001' - X'7FFF'	Xbc Units per UNIT BASE	X'0206..05'

Offset	Range	Meaning	Error Code
8-9	X'0001' - X'7FFF'	Ybc Units per UNIT BASE	X'0206..05'
10-11	X'0001' - X'7FFF'	X EXTENT of Bar Code Presentation Space in L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use BCOC X EXTENT	
12-13	X'0001' - X'7FFF'	Y EXTENT of Bar Code Presentation Space in L-units. See "Notation Conventions", IPDS Technical Reference 1.	X'0207..05'
	X'FFFF'	Use BCOC Y EXTENT	
14-15	X'0000'	Reserved	
16		BAR CODE TYPE See page 179 "Bar Code Type and Modifier Description and Values"	X'0403..00'
17		BAR CODE MODIFIER See page 179 "Bar Code Type and Modifier Description and Values"	X'040B..00'
18	X'01' - X'FE'	FONT LOCAL ID	X'0404..00'
	X'FF'	Default Font Local ID (Note 1)	

Offset	Range	Meaning	Error Code
19-20		COLOR (Named Color)	X'0405..00'
	X'0000' or X'FF00'	Printer Default (Black)	
	X'0001' or X'FF01'	Blue - Limited Simulated Color Support	
	X'0002' or X'FF02'	Red - Limited Simulated Color Support	
	X'0003' or X'FF03'	Pink - Limited Simulated Color Support	
	X'0004' or X'FF04'	Green - Limited Simulated Color Support	
	X'0005' or X'FF05'	Turquoise - Limited Simulated Color Support	
	X'0006' or X'FF06'	Yellow - Limited Simulated Color Support	
	X'0007'	White - Color of Medium (Reset) Black	
	X'0008'	Dark Blue - Limited Simulated Color Support	
	X'0009'	Orange - Limited Simulated Color Support	

Offset	Range	Meaning	Error Code
19-20	X'000A'	Purple - Limited Simulated Color Support	
	X'000B'	Dark Green - Limited Simulated Color Support	
	X'000C'	Dark Turquoise - Limited Simulated Color Support	
	X'000D'	Mustard - Limited Simulated Color Support	
	X'000E'	Gray - Limited Simulated Color Support	
	X'000F'	Brown - Limited Simulated Color Support	
	X'0010'	Printer Default (Black)	
	X'FF07'	Color of Medium (Reset)	
	X'FF08'	Printer Default (Black)	
	X'FFFF'		
21		UNIT MODULE WIDTH	X'0406..00'
	X'07' - X'36'	Printer Default	
	X'FF'	Range and Printer Default are specified by Bar Code Type in Byte 16 (especially 2D bar codes)	
22-23	X'0001' - X'7FFF'	ELEMENT HEIGHT in L-units See "Notation Conventions", IPDS Technical Reference 1.	X'0407..00'
	X'FFFF'	Printer Default as specified by Bar Code Type in Byte 16	
24	X'01'-X'FF'	Height multiplier	X'0408..00'

Offset	Range	Meaning	Error Code
25-26		WIDE-TO-NARROW RATIO (WE|NE)	X'0409..00'
	X'0000'	Not Applicable Note 2	
	X'0002'	2: 1	
	X'0003'	3: 1	
	X'0014' to X'001E'	2.0: 1 - 3.0: 1	
	X'00C8' to X'012C'	2.00: 1 - 3.00: 1	
	X'FFFF'	Printer Default as specified by Bar Code Type (Byte 16)	
27-end		Ignored	

- The Font Local ID specified in BCDD Byte 18 should be OCR-A, OCR-B or Code 128 dependent on the Bar Code Type specified in BCDD Byte 16. The default Font Local ID and Bar Code Type relationships are as follows:

OCR-A	OCR-B
Code 128	UPC-A
Code 3 of 9	UPC-E
MSI	UPC 2-Digit Add-on
2 of 5 Industrial	UPC 5-Digit Add-on
2 of 5 Matrix	EAN-8
2 of 5	EAN-13
Interleaved	EAN 2-Digit Add-on
Codabar	EAN 5-Digit Add-on

- Wide-to-Narrow Ratio (BCDD Bytes 25-26) is only valid for the following Bar Code Types:
  - X'01' 3 of 9
  - X'02' MSI
  - X'0A' 2 of 5 Industrial
  - X'0B' 2 of 5 Matrix
  - X'0C' Interleaved 2 of 5
  - X'0D' Codabar

- Default wide-to-narrow ratio for Codabar, Code 3 of 9, and the 2 of 5 types is dictated by the lowest unit module width that results in a readable bar code. The default wide-to-narrow ratio for MSI is 2:1 unless it can't be printed with the selected unit module width.

Bar Code Type and Modifier Description and Values

Bar Code Type (Byte 16)	Bar Code Description	Unit Module Width Default (mils)	Unit Module Width Range (mils)	Element Height Default (mils)	Element Height Range (mils)	Wide-to-Narrow Ratio
X'01'	3 of 9 Code AIM USS-39	14	7-54	234	234-14000	7.3
X'02'	MSI	14	7-54	300	300-14000	
X'03'	UPC/ CGPC Version A	14	7-54	1020	250-14000	
X'05'	UPC/ CGPC Version E	14	7-54	1020	250-14000	
X'06'	UPC 2 Character Supplemental (Periodicals)	14	7-54	1020	250-14000	
X'07'	UPC 5 Character Supplemental (Paperbacks)	14	7-54	1020	250-14000	
X'08'	EAN-8 (JAN Short)	14	7-54	840	250-14000	
X'09'	EAN-13 (JAN Standard)	14	7-54	1020	250-14000	

Bar Code Type (Byte 16)	Bar Code Description	Unit Module Width Default (mils)	Unit Module Width Range (mils)	Element Height Default (mils)	Element Height Range (mils)	Wide-to-Narrow Ratio
X'0A'	Industrial 2 of 5	14	7-54	234	234-14000	8:02
X'0B'	Matrix 2 of 5	14	7-54	234	234-14000	4:02
X'0C'	Interleaved 2 of 5 AIM USS-I 2/5	14	7-54	234	234-14000	3:02
X'0D'	Codabar 2 of 7 Code AIM USSCodabar	14	7-54	234	234-14000	4:02
X'11'	Code 128 AIM USS-128	14	7-54	250	250-14000	
X'16'	EAN 2 Digit Add-on	14	7-54	1020	250-14000	
X'17'	EAN 5 Digit Add-on	14	7-54	1020	250-14000	
X'18'	POSTNET (Include PLANET)	14	7-54	1000	250-14000	
X'1A'	RM4SCC Royal Mail (Inc. Dutch KIX)	14	7-54	1000	250-14000	
X'1B'	Japan Postal	14	7-54	1000	250-14000	
X'1C'	Data Matrix 2D	21	12-254	21	12-254	

Bar Code Type (Byte 16)	Bar Code Description	Unit Module Width Default (mils)	Unit Module Width Range (mils)	Element Height Default (mils)	Element Height Range (mils)	Wide-to-Narrow Ratio
X'1D'	MaxiCode 2D					
X'1E'	PDF417 2D	14	7-254	15% of width or 0.2 in.	4*width - 524287	
X'1F'	Australia Post	14	7-54	1000	250-14000	
X'20'	QR Code 2D	14	7-254	21	12-254	
X'21'	Code 93	14	7-54	234	234-14000	7:03
X'22'	USPS Four-State	14	7-54	1000	250-14000	

Bar Code Type and Modifier Description and Values

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'01'	X'01' 3 of 9 Code, AIM USS-39	X'01'	Print Bar Code with no Printer-Generated Check Character.
		X'02'	Generate Check Character and Print with Bar Code.

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'02'	MSI	X'01'	Print Bar Code with no Printer-Generated Check Character.
		X'02'	Print Bar Code with IBM Modulus 10 Check Digit Generated by Printer and Put at End of Data.
		X'03'	First check digit IBM Modulus 10.
		X'04'	First check digit NCR Modulus 11. Check digit equals remainder. Check digit of 10 equals error.
		X'05'	First check digit IBM Modulus 11. Check digit equals remainder. Check digit of 10 equals error.
		X'06'	First check digit NCR Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals zero.
		X'07'	First check digit IBM Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals error.
		X'08'	First check digit NCR Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals error.
		X'09'	First check digit IBM Modulus 11. Check digit equals 11 minus remainder. Check digit of 10 equals error.
X'03'	UPC/CGPC Version A	X'00'	Generate check digit and Print standard symbol.
X'05'	UPC/CGPC Version E	X'00'	Print bar code. Six digits are encoded.
X'06'	UPC 2-Character Supplemental (Periodicals)	X'00'	Print the 2 supplemental digits (bar/space pattern and HRI).

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'07'	UPC 5-Character Supplemental (Paperbacks)	X'00'	Print the 5 supplemental digits (bar/space pattern and HRI).
X'08'	EAN-8 (JAN Short)	X'00'	Print bar code symbol. Input variable data is 7 digits (2 flag and 5 article ID digits).
X'09'	EAN-13 (JAN Standard)	X'00'	Print bar code symbol. Input variable data is 12 digits (2 flag and 10 article ID digits).
X'0A'	2 of 5 Industrial	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code.
X'0B'	2 of 5 Matrix	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code.
X'0C'	Interleaved 2 of 5, AIM USS-I 2/5	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code.
X'0D'	Codabar, 2 of 7 Code, AIM USS-Codabar	X'01'	Print bar code with no printer-generated check character.
		X'02'	Generate check character and print with bar code (Check character appears in HRI).
X'11'	Code 128, AIM USS-128	X'02'	Generate check character and print with bar code.
		X'03'	Generate check character and print with bar code that supports UCC/EAN 128.
X'16	EAN 2 Digit Add-on	X'00'	Print the 2 digit add-on (bar/space pattern and HRI).
X'17'	EAN 5 Digit Add-on	X'00'	Print the 5 digit add-on (bar/space pattern and HRI).

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'18'	POSTNET		USPS Specification
		X'00'	Print 5 digit POSTNET 'Zip Code' bar code with leading frame bar and trailing correction digit and frame.
		X'01'	Print 9 digit POSTNET 'Zip + 4' bar code with leading frame bar and trailing correction digit and frame.
		X'02'	Print 11 digit POSTNET 'ABC' bar code with leading frame bar and trailing correction digit and frame.
		X'03'	Print variable length data POSTNET bar code with leading frame bar and trailing correction digit and frame. Data length checking is not performed with modifier X'03'.
		X'04'	Print PLANET bar code symbology.
X'1A'	RM4SCC (Royal Mail 4 State Customer Code)	X'00'	Variable Length Data. Printer will generate Start bit, Checksum Character and Stop bit. Checksum algorithm is performed on the data characters only. User is responsible for 2 mm quiet zone (all around) and proper sequencing of the Postal Code data (including International Prefix, Outward Code, Inward Code and Delivery Point Suffix).
X'1A'	RM4SCC (Dutch KIX Postal Bar Code)	X'01'	Present a RM4SCC bar code symbol with NO Start bit, NO Checksum Character and NO Stop bit. Checksum algorithm is performed on the data characters only. User is responsible for 2 mm quiet zone (all around) and proper sequencing of the Postal Code data (including International Prefix, Outward Code, Inward Code and Delivery Point Suffix).

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'1B'	Japan Postal Bar Code	X'00'	Present a Japan Postal Bar Code symbol with a generated start character, checksum character and stop character.
		X'01'	Present a Japan Postal Bar Code symbol directly from the bar code data.
X'1C'	Data Matrix 2D	X'00'	Present a Data Matrix Bar Code symbol.
X'1D'	MaxiCode 2D	X'00'	Present a MaxiCode Bar Code symbol.
X'1E'	PDF417 2D	X'00'	Present a "full" PDF417 Bar Code symbol.
		X'01'	Present a "truncated" PDF417 Bar Code symbol.

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'1F'	Australia Post	X'01'	Standard Customer Bar Code (Format Code 11) - An 8 digit number representing the Sorting Code.
		X'02'	Customer Bar Code 2 using Table N (Format Code 59) An 8 digit number representing the Sorting Code, followed by up to 8 numeric digits representing the Customer Information.
		X'03'	Customer Bar Code 2 using Table C (Format Code 59) An 8 digit number representing the Sorting Code, followed by up to 5 characters (A-Z, az, 0-9, space, #) representing the Customer Information.
		X'04'	Customer Bar Code 2 using proprietary encoding (Format Code 59) - An 8 digit number representing the Sorting Code, followed by up to 16 numeric digits (0-3) representing the Customer Information. Each of the 16 digits specify one of the 4 types of bar code.
		X'05'	Customer Bar Code 3 using Table N (Format Code 62) An 8 digit number representing the Sorting Code, followed by up to 15 numeric digits representing the Customer Information.
		X'06'	Customer Bar Code 3 using Table C (Format Code 62) An 8 digit number representing the Sorting Code, followed by up to 10 characters (A-Z, a-z, 0-9, space, #) representing the Customer Information.
		X'07'	Customer Bar Code 3 using proprietary encoding (Format Code 62) - An 8 digit number representing the Sorting Code, followed by up to 31 numeric digits (0-3) representing the Customer Information. Each of the 31 digits specify one of the 4 types of bar code.
		X'08'	Reply Paid Bar Code (Format Code 45) - An 8 digit number representing the Sorting Code.

Byte 16 Value	Bar Code Type	Byte 17 Value	Meaning
X'20'	QR Code 2D	X'02'	Present a model 2 QR Code bar code symbol.
X'21'	Code 93	X'02'	Present a Code 93 bar code symbol.
X'22'	USPS Four State		USPS Specification
		X'00'	Present a USPS Four-State bar code symbol with no Routing ZIP Code. The input data for this bar code symbol must be 20 numeric digits.
		X'01'	Present a USPS Four-State bar code symbol with a 5-digit Routing ZIP Code. The input data for this bar code symbol must be 25 numeric digits. The valid values for the Routing Zip Code are 00000-99999.
		X'02'	Present a USPS Four-State bar code symbol with a 9-digit Routing ZIP Code. The input data for this bar code symbol must be 29 numeric digits. The valid values for the Routing Zip Code are 000000000- 999999999.
		X'03'	Present a USPS Four-State bar code symbol with an 11 digit Routing ZIP Code. The input data for this bar code symbol must be 31 numeric digits. The valid values for the Routing Zip Code are 00000000000- 99999999999.

Write Bar Code

Offset	Range	Meaning	Error Code
0		FLAGS	
	Bit 0	HRI PRINTING (Not supported for postal bar code types)	
	0	Print HRI	X'0410..00'
	1	No HRI	
	Bits 1-2	HRI LOCATION	
	00	Printer Default (Below symbol)	
	01	Below symbol (Except UPC/EAN with 2 or 5 digit add-on)	
	10	Above symbol (UPC/EAN with 2 or 5 digit add-on only)	
	Bit 3	START/STOP HRI for 3 of 9 Code (Asterisk)	
	0	Do not print HRI for 3 of 9 Start/Stop pattern	
	1	Print HRI for 3 of 9 Start/Stop pattern	
	Bit 4	CODE PAGE TYPE (Ignore)	
	Bit 5	BAR CODE SUPPRESSION	
	0	Present the bar code symbol	
	1	Suppress presentation of the bar code symbol	
	Bit 6		
	Bit 7		
1-2	X'0001' - X'7FFF'	X COORDINATE of the symbol ORIGIN See "Notation Conventions", IPDS Technical Reference 1.	X'040A..00'
3-4	X'0001' - X'7FFF'	Y COORDINATE of the symbol ORIGIN See "Notation Conventions", IPDS Technical Reference 1.	X'040A..00'

Offset	Range	Meaning	Error Code
5-End		DATA to be bar encoded	X'040C..00'

7. Overlay Command Set

Overlay Function Set Commands

Name	Command	Sub-command	Where to Look
Begin Overlay	X'D6DF'		Intelligent Printer Data Stream Reference
Deactivate Overlay	X'D6EF'		Intelligent Printer Data Stream Reference
Include Overlay	X'D67D'		Intelligent Printer Data Stream Reference

8. Page Segment Command Set

Page Segment Function Set Commands

Name	Command	Sub-command	Where to Look
Begin Page Segment	X'D65F'		Intelligent Printer Data Stream Reference
Deactivate Page Segment	X'D66F'		Intelligent Printer Data Stream Reference
Include Page Segment	X'D67F'		Intelligent Printer Data Stream Reference

9. Object Container Command Set

Object Container Function Set Commands

Name	Command	Sub-command	Where to Look
Write Object Container Control	X'D63C'		Intelligent Printer Data Stream Reference
Write Object Container	X'D64C'		Intelligent Printer Data Stream Reference
Deactivate Data-Object-Font	X'D65B'		Intelligent Printer Data Stream Reference
Deactivate Data-Object-Resource	X'D65C'		Intelligent Printer Data Stream Reference
Data-Object-Resource Equivalence	X'D66C'		Intelligent Printer Data Stream Reference
Include Data-Object	X'D67C'		Intelligent Printer Data Stream Reference

Note

- For specific details on the Object Container Command Set, see the Intelligent Printer Data Stream Reference, S544-3417.

10. Loaded Font Command Set

Loaded Font Function Set Commands

Name	Command	Sub-command	Where to Look
Load Code Page	X'D61B'		page 197 "Load Code Page"
Load Code Page Control	X'D61A'		page 198 "Load Code Page Control"
Load Font	X'D62F'		page 200 "Load Font"
Load Font Character Set Control	X'D619'		page 202 "Load Font Character Set Control"
Load Font Control	X'D61F'		page 203 "Load Font Control"
Load Font Index	X'D60F'		page 208 "Load Font Index"

Load Code Page

This command assigns each code point of a code page to a specific Graphic Character Global ID (GCGID). One or more Load Code Page (LCP) commands follow the Load Code Page Control command.

A sequence of LCP commands are used to transmit the entire code page. This sequence is initiated by the first LCP command that contains data and terminates with an End command. Entries may be split across LCP commands on any byte boundary and are restricted in size by the standard IPDS 32767 byte command length limit.

Offset	Range	Meaning	Error Code
0-7	(8 Bytes)	GRAPHIC CHARACTER GLOBAL ID	

Offset	Range	Meaning	Error Code
8	Bit 0: 0/1	PROCESSING FLAGS	
	Bit 1: 0/1	Defined/Undefined	
	Bit 2: 0/1	Defined/Undefined	
	Bits 3-7	Incrementing/Nonincrementing Reserved	
9-n		CODE POINT	X'02B0..07'

Load Code Page Control

This command describes a code page resource which will be used to carry code page data. The Load Code Page Control (LCPC) command is followed by one or more Load Code Page (LCP) commands that specify the code page data.

The LCPC command is valid only in Home State and causes a transition to Code Page State. Code Page State ends when the printer receives the End command following receipt of at least one LCP command.

Offset	Range	Meaning	Error Code
0-1	X'0001' - X'7EFF'	CODE PAGE HOST ASSIGNED ID	X'02B0..00' X'02B0..01'
2-3		ENCODING SCHEME	X'02B0..02'
	Bits 0-3: 0000	Reserved	
		Number of Bytes	
	Bits 4-7: 0001	Fixed Single-byte	
	Bits 4-7: 0010	Fixed Double-byte	
	Bits 8-15: 00000000	Reserved	

Offset	Range	Meaning	Error Code
4-7	X'00000000A'-X'FFFFFFFF'	BYTE COUNT for subsequent LCP commands	X'02B0..04' X'02B0..05'
8-9	X'0000'	Reserved	
10-n		VARIABLE SPACE CODE POINT	
	X'nn'	SBCS	
	X'nnnn'	DBCS	
n+1 to n+2		GCSGID	
	X'0000'	No Value Supplied	
	X'0001' - X'FFFE'	Specific GCSGID	
	X'FFFF'	Use Default	
n+3 to n+4	X'0001' - X'FFFE'	CPGID Specific CPGID	
n+5 to n+12		GCGID	
	X'nnnnnnnnnnnnnnnn'	Default GCGID	

Offset	Range	Meaning	Error Code
n+13		GCGID PROCESSING FLAGS	
	Bit 0: 0	Defined	
	Bit 0: 1	Undefined	
	Bit 1: 0	Printing	
	Bit 1: 1	Nonprinting	
	Bit 2: 0	Incrementing	
	Bit 2: 1	Nonincrementing	
	Bit 3: 0	Reserved	
	Bit 4: 0	Retired	
	Bit 4: 1	Retired	
	Bit 5 - 7: 0000	Reserved	

Note

- If the code point specified in VARIABLE SPACE CODE POINT is not contained in the associated font character set, the printer will use a character increment of 333 relative units for typographic and proportionally spaced fonts and 600 relative units for fixed pitch, uniform character increment fonts.
- GCSGID/CPGID will be used for CMAP matching (DBCS), in all other instances they will be ignored.

Load Font

LF1 Format

When downloading a fully described font (LF1 format), the Load Font (LF) carries a series of character raster pattern bit strings. Consecutive Load Font commands are supported for downloading the LF1 font character patterns.

Offset	Range	Meaning	Error Code
0-n	Any Value in conformance with LFC Font Byte Count	FONT DATA in LF1 FORMAT (Character Patterns)	X'022E..02' X'0232..02'

LF3 Format

When downloading a font character set (LF3 format), the LF consists of a character ID map followed by zero or more (technology specific) Adobe Type-1 PFB objects. Consecutive LF commands are supported for downloading the LF3 font data.

Character ID Map

Offset	Range	Meaning	Error Code
0	X'02'	IBM CHARACTER ID FORMAT (IBM Registered EBCDIC GCGID)	
1	X'03' X'04'	TECHNOLOGY SPECIFIC CHARACTER ID FORMAT Font-specific ASCII Character name used with Type-1 PFB fonts ASCII numeric Glyph ID (used with Adobe Composite fonts) ASCII numeric Glyph ID (used with Adobe Composite fonts)	
Zero of more entries in the following format			
+0-7		IBM CHARACTER ID (GCGID)	X'02B1..04'
+8-11		OFFSET into the following list of Adobe Type-1 Character ID entries (each GCGID maps to exactly one Adobe Type-1 Character ID)	
Zero or more Adobe Type-1 Character ID entries in the following			
++0	X'02'-X'80'	LENGTH of Adobe Type-1 Character ID entry (including this field)	X'02B1..03'
+1-n		ADOBE Type-1 CHARACTER ID	

Technology Specific Font Objects

The technology specific LF3 font object supported is a form of Adobe Type-1 PFB file. Each PFB object contains the following information.

Offset	Range	Meaning	Error Code
0-3	X'00000000A' - X'FFFFFFFF'	LENGTH of Adobe Type-1 PFB file (including this field)	X'02B1..08'
4-7		CHECKSUM	X'02B1..09'
8-9	X'0002' - X'FFFF'	LENGTH of Adobe PFB object NAME	X'02B1..0A
10-n		Adobe PFB Object NAME	
(n+1)-z		OBJECT DATA for Adobe Type-1 PFB fonts (PFB file)	

Load Font Character Set Control

This command provides control information for each font character set that the host downloads to the printer. The command is only used for LF-3 type coded fonts. The LFCSC command is followed by one or more Load Font commands that contain the actual font character set information. This command is valid only in home state and causes a transition to font state. Font state ends when the printer receives the End command following receipt of at least one LF command.

Offset	Range	Meaning	Error Code
0-1	X'0001' - X'7EFF'	FONT CHARACTER SET HAID	X'02B0..0A' X'02B0..0B'
2-3	X'0000'	Reserved	
4		PATTERN TECHNOLOGY ID	
	X'1F'	Type 1 PFB	
5	X'00'	Adobe PFB Object NAME	

Offset	Range	Meaning	Error Code
6		INTENDED USE FLAGS	X'02B2..04' X'02B2..01' X'02B2..02'
	Bit 0: 0/1	Not intended for MICR printing/Intended for MICR printing (If MICR Installed)	
	Bit 1: 0/1	This is NOT a FCS extension/This IS a FCS extension	
	Bits 2-7: 000000	Reserved	
7-10	X'00000002' - X'FFFFFFFF'	NUMBER of BYTES in the LOAD FONT COMMANDS	X'022E..02' X'0232..02' X'02B0..0E'
11-14	X'00000002' - X'FFFFFFFF'	NUMBER of BYTES in the CHARACTER ID MAP	X'02B0..0F'
15-16	X'nnnn'	NUMBER of GCGIDs in the CHARACTER ID MAP	
17-18		GCSGID	
	X'0000'	No Value Supplied	
	X'0001' - X'FFFE'	Specific GCSGID	
	X'FFFF'	Use Default	
19-20		FGID	
	X'0001' - X'FFFE'	Specific FGID	

12

Load Font Control

This command is 40 + (8 × n) bytes long, where n (4090 max) is the number of font characters that have associated raster patterns. The command contains font id, overall font characteristics, and the

information needed to parse the font raster patterns. There is only one Load Font Control command for each font or font section. This command can only be issued in Home State and causes a transition to Font State.

Offset	Range	Meaning	Error Code
0-1	X'0001'-X'7EFF'	FONT HOST ASSIGNED ID	X'0218..02' X'0239..02'
2		SECTION ID	X'0243..02'
	X'00'	Single-byte fonts	
	X'41'-X'FE'	Double-byte font sections	
3	X'00'	Reserved (Font-index Format)	X'0221..02'
4	X'05'	Pattern Data Format (bounded box)	X'0222..02'
5		FONT TYPE BITS	X'0223..02'
	Bits 0-1: 00	Reserved	
	Bits 2-3: 01/10	FONT TYPE: Single-byte/Double-byte	
	Bits 4-5: 00	Reserved	
	Bit 6: 1/0	CHARACTER BOX SIZE: Uniform size (see bytes 6-7)/ Individual size (see bytes 40-End)	
	Bit 7: 0	Reserved	
6-7	X'0001' - X'7FFF'	UNIFORM or MAXIMUM CHARACTER BOX X SIZE	X'0226..02'
8-9	X'0001' - X'7FFF'	UNIFORM or MAXIMUM CHARACTER BOX Y SIZE	X'0227..02'

Offset	Range	Meaning	Error Code
10		UNIT BASE for L-units	X'021B.. 02'
	X'00'	Ten in. (fixed metric technology)	
	X'02'	Relative units (relative metric technology)	
11	X'00'	Reserved	
12-13		L-units per UNIT BASE in the X direction Byte 10 = X'02'	X'022A.. 02'
	X'03E8'	1000 Byte 10 = X'00'	
	X'0960'	2400 (240 DPI)	
	X'0BB8'	3000 (300 DPI)	
	X'1770'	6000 (600 DPI)	
14-15		L-units per UNIT BASE in the Y direction Byte 10 = X'02'	X'022B.. 02'
	X'03E8'	1000 Byte 10 = X'00'	
	X'0960'	2400 (240 DPI)	
	X'0BB8'	3000 (300 DPI)	
	X'1770'	6000 (600 DPI)	
16-17	X'0000'	Reserved	
18-20	X'000001' - X'7FFFFF'	FONT BYTE COUNT	X'021C.. 02'
21		CHARACTER DATA ALIGNMENT	X'022D.. 02'
	X'01'	Starting address 1 byte aligned	
	X'04'	Starting address 4 byte aligned	
	X'08'	Starting address 8 byte aligned	
22-23	X'nnnn'	GCSGID (ignored)	

Offset	Range	Meaning	Error Code
24-25	X'nnnn'	CPGID (ignored)	
26	X'00'	UNIT BASE for PIXEL-Units Ten in.	X'0287..02'
27	X'00'	Reserved	
28-29		PIXEL-Units per UNIT BASE in the X direction (only applicable if byte 10 = x'02')	X'0288..02'
	X'0960'	2400 Units per 10 in. (240 dpi)	
	X'0BB8'	3000 Units per 10 in. (300 dpi)	
	X'1770'	6000 Units per 10 in. (600 dpi)	
30-31		PIXEL-Units per UNIT BASE in the Y direction (only applicable if byte 10 = x'02')	X'0289..02'
	X'0960'	2400 Units per 10 in. (240 dpi)	
	X'0BB8'	3000 Units per 10 in. (300 dpi)	
	X'1770'	6000 Units per 10 in. (600 dpi)	
32-33	X'0001' - X'7FFF'	RELATIVE METRIC MULTIPLYING FACTOR	X'028A..02'
34-35	X'nnnn'	FGID (ignored)	
36		STAGEABILITY	X'0220..02'
	X'01'	Font is not stageable (retired)	
37	Bit 0: 0/1	INTENDED USE FLAGS: Not intended for MICR printing/ Intended for MICR printing (If MICR Installed)	
	Bits 1-7: 0000000	Reserved	
38-39	X'nnnn'	Font width (ignored)	
40-n		Zero or more CHARACTER PATTERN DESCRIPTORS in the following format	

Offset	Range	Meaning	Error Code
+ 0-1 bytes	X'0000' - X'7FFF'	CHARACTER BOX X SIZE	X'0226..02'
+ 2-3 bytes	X'0000' - X'7FFF'	CHARACTER BOX Y SIZE	X'0227..02'
+ 4-7 bytes	X'00000000' - X'007FFFFE'	CHARACTER PATTERN ADDRESS	X'023E..02'

Load Font Index

This command is 32 + (256 × 16) (the (256 × 16) byte field is not always required) bytes long. It contains general information needed to print the patterns and a description of the characteristics of each of the 256 possible code points. Each font can have from one to four associated font indices.

Each index is loaded by a separate Load Font Index command. This command can only be issued in Home State.

Offset	Range	Meaning	Error Code
0-1	X'0001'-X'7EFF'	FONT HOST ASSIGNED ID (HAID)	X'0218..02'
2		SECTION ID	X'0243..02'
	X'00'	Single byte	
	X'41'-X'FE'	Double-byte section	
3		FLAGS	
	Bit 0: 0/1	VARIABLE SPACE: Disabled/Enabled	
	Bits 1-7: 0000000	Reserved	
4-5		FONT INLINE SEQUENCE	X'0240..02' X'0246..02'
	X'0000'	0 degrees	
	X'2D00'	90 degrees	
	X'5A00'	180 degrees	
	X'8700'	270 degrees	
6-7	X'0000'	Reserved	
8-9	X'8000' - X'7FFF'	UNIFORM or MAXIMUM BASELINE OFFSET	X'023C..02'
10-11	X'8000' - X'7FFF'	UNIFORM or MAXIMUM CHARACTER INCREMENT	X'023C..02'
12-13	X'0000'	Reserved	

Offset	Range	Meaning	Error Code
14-15	X'0000' - X'7FFF'	MAXIMUM BASELINE EXTENT	
16		ORIENTATION FLAGS	
	Bits 0-4: 00000	Reserved	
	Bit 5: 1/0	UNIFORM A-SPACE: Bytes 18, 19 specify uniform value/ Bytes 18, 19 specify minimum value A-space for each character is in the character index entry	
	Bit 6: 1/0	UNIFORM BASELINE OFFSET: Bytes 8, 9 specify uniform baseline offset/Bytes 8, 9 specify minimum baseline offset (Baseline offset for each character is in the character index entry)	
	Bit 7: 1/0	UNIFORM CHARACTER INCREMENT: Bytes 10, 11 specify uniform character increment/Bytes 10, 11 specify minimum character increment (Character increment for each character is in the character index entry)	
17	X'00'	Reserved	
18-19	X'8000' - X'7FFF'	UNIFORM or MINIMUM A-SPACE	X'023C.. 02'
20-21	X'0000' - X'FFFF'		
22-23	X'8000' - X'7FFF'		
24-25	X'0000'	RECOMMENDED UNDERSCORE WIDTH	X'023C.. 02'
	X'0001' - X'7FFF'	No recommendation Underscore width in L-units	
26-27	X'8000' - X'7FFF'	RECOMMENDED UNDERSCORE POSITION (L-units)	
28-31	X'00000000'	Reserved	

Offset	Range	Meaning	Error Code
32-412 7			
+ 0-1 bytes		CHARACTER FLAGS	
	X'0000'	Defined, printing, incrementing	
	X'2000'	Defined, printing, non-incrementing	
	X'4000'	Defined, non-printing, incrementing	
	X'6000'	Defined, non-printing, non-incrementing	
	X'8000'	Undefined, printing, incrementing	
	X'A000'	Undefined, printing, non-incrementing	
	X'C000'	Undefined, non-printing, incrementing	X'023C.. 02'
	X'E000'	Undefined, non-printing, non-incrementing	X'023C.. 02'
+ 2-3 bytes	X'0000' - X'xxxx'	PATTERN INDEX	
+ 4-5 bytes	X'8000' - X'7FFF'	CHARACTER INCREMENT	
+ 6-7 bytes	X'8000' - X'7FFF'	A-SPACE	X'023C.. 02'
+ 8-13 bytes	X'000000 000000'	Reserved	
+ 14-15 bytes	X'8000' - X'7FFF'	BASELINE OFFSET	

11. Appendix

Trademarks

Adobe, Acrobat, PostScript, and Reader are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

AFP/ADVANCED FUNCTION PRINTING, InfoPrint, IPDS and Intelligent Printer Data Stream are trademarks of Ricoh Co., Ltd.

IBM® is a trademark of International Business Machines Corporation in the United States, other countries, or both.

AIX®, Application System/400®, AS/400®, IBM®, OS/400®, Print Services Facility, PS/2®, and PSF are trademarks of International Business Machines Corporation in the United States, other countries, or both.

PCL® is a registered trademark of Hewlett-Packard Company.

Monotype is a registered trademark of Monotype Imaging, Inc.

Windows® is either registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

Other product names used herein are for identification purposes only and might be trademarks of their respective companies. We disclaim any and all rights to those marks.

INDEX

A

Acknowledgement Reply....10
Activate Resource....13
Audience....7

B

Bar Code Area Position....172
Bar Code Commands....171
Bar Code Data Descriptor....174
Bar Code Output Control....173
Begin Image Content....142
Begin Page....22
Begin Segment....142
Begin Segment Introducer....156

D

Deactivate Font....23
Device Control Command Set....9
Drawing Order Summary....168
Drawing Orders....156

E

End....26
End Image Content....146
End Page....27
End Segment....146
Execute Order Any State....62
Execute Order Home State....69

F

Finishing Fidelity Control....48

G

Graphics Area Position....147
Graphics Commands....147
Graphics Data Descriptor....150
Graphics Output Control....148
Group ID Triplet....104

I

IM Image Commands....129
Image Area Position....136
Image Data....145
Image Data Descriptor....139
Image Data Element Size Parameter....143, 144
Image Look-up Table ID Parameter....145
Image Output Control....137
Image Size Parameter....142
IO Image Commands....135

L

Load Code Page....197
Load Code Page Control....198
Load Copy Control....28
Load Equivalence....107
Load Font....200
Load Font Character Set Control....202
Load Font Control....203
Load Font Equivalence....36
Load Font Index....208
Loaded Font Function Set Commands....197
Logical Page Descriptor....40
Logical Page Position....45

M

Media Source and Destination Support Matrices....30

N

Notice....5

O

Overlay Function Set Commands....191

P

Page Segment Function Set Commands....193
Presentation Fidelity Control....47
Presentation Text Commands....107
Printable Area Self-Defining Field....69

S

Sense Type and Model....49
Set Process Color....165
Symbols....6

T

Temporary Baseline Move....124
Terminology....7
Text Fidelity Control....47

Trademarks.....211

W

Write Bar Code.....188
Write Bar Code Control.....172
Write Graphics.....155
Write Graphics Control.....147
Write Graphics Defaults.....155
Write Image.....134
Write Image 2.....142
Write Image Control.....130
Write Image Control 2.....136
Write Text.....107

X

XOA.....62
XOA Exception Handling Control.....62
XOA Mark Form.....62
XOA Request Resource List.....64
XOH.....69
XOH Define Group Boundary.....103
XOH Obtain Printer Characteristics.....69
XOH Page Counter Control.....103
XOH Select Input Media Source.....99
XOH Set Media Origin.....101
XOH Set Media Size.....102
XOH Specify Group Operation.....106

MEMO

MEMO

EN GB EN US EN AU M109-8624