

# **SAP Printing**

## **Customer documentation**

### **Volume 3 : [DC40]**

## **Device-specific information**

for

- NRG
- SP C410DN  
SP C411DN

Version: 1.15

**Abstract:**

This document contains device-specific information about the device hardware and accessories, the configurable features, related limitations, and the commands necessary to configure the settings in the device type.

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### **Important notice**

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

## 1. General Device Information

This chapter contains general information about the devices.

### SAP device types to use:

- PCL-based **ZA0x**, ver 005+

### Device / Model name:

• [DC40a]	SP C410DN	
• [DC40b]	SP C411DN	
• [DC40L]	--	

**Compatibilities/Emulation:** HP PCL 5c

### Firmware (PCL):

**Note:** It is recommended to always use the latest firmware.

### Speed:

[DC40a]: 25 ppm A4 / LTR (simplex Monochrome/Color)  
 [DC40b]: 30 ppm A4 / LTR (simplex Monochrome/Color) [DC40L]: 25 ppm A4 / 26 ppm LTR (simplex Monochrome/Color)

**Printer queue name** lp

## 2. Device Hardware Accessories

This chapter contains information about the standard or optionally available hardware accessories of the devices.

The Description column indicates the name of the unit, its properties, and, where applicable, the supported paper sizes and the sheet capacity. It also contains a list of features which can be configured on the device's front panel, as well as their initial factory defaults.

For more device-specific information, see also the device's corresponding Operating Instructions manual.

### Device Hardware Accessories

Unit		Description
<b>Memory (RAM)</b>	standard optional	256MB <ul style="list-style-type: none"> <li>• [Memory Unit Type D] + 128 MB or 256 MB Max. memory up to 512MB For detailed information about how much memory is needed for which resolution, please see (*).</li> </ul>
<b>Hard Disk</b>	optional	<ul style="list-style-type: none"> <li>• [Printer Hard Disk Drive Type 4000] - Capacity = 40 GB</li> </ul>
<b>Bypass</b>	standard	(paper input) Bypass Tray unit - The unit is integrated in the front of the device. - Capacity = 100 sheets - Paper = see (*)
<b>Paper Tray</b> (Tray 1)	standard	(paper input) standard input bin - Capacity = 550 sheets - Paper = see (*)
<b>Paper Feed Units</b> (Tray 2, 3)	optional (max. 2)	(paper input) additional input bins <ul style="list-style-type: none"> <li>• [Paper Feed Unit Type 4000] - attached underneath Tray 1 - Capacity = 550 sheets each - Paper = see (*)</li> </ul>
<b>Duplex unit</b>	standard	(paper path) needed for duplexing - Paper = see (*)
<b>Standard Tray</b>	standard	(paper output) standard output bin - Capacity = 550 sheets - Paper = see (*)

**Note:** (\*) = See the corresponding Operating Instructions manual.

**Note:** There is no Mailbox; there is no proper LCT.

### **Features configurable on the device front panel**

The following table specifies those features that can be configured from the device's front panel, and their initial factory default settings. For those features whose setting is typically unlikely to be changed often, they can be configured once on the device front panel, and thus need no configuration from the SAP system side.

Feature	Initial (factory) setting
• Resolution	600 dpi
• Symbol set	PC-8
• Tray priority	Tray 1
• Duplex mode	Off
• Auto Continue	Off
• Auto Tray Switching	Off
• Sub Paper Size (*)	Off
• Copies	1

**Note:** (\*) Paper size override function

## **3. Features & Commands**

This chapter contains one section for each configurable feature.

The features are ordered by importance (how often used) and logical order (in the processing of the job).

- 3.1 - 3.7 = likely to be configured / changed
- 3.8 - 3.13 = unlikely to be changed often
- 3.14 - 3.21 = changing makes no sense or has no effect, or it must or should not be changed
- 3.22 - ... = additional features

Each section contains the following information about the feature:

1. Description of the **Feature**
2. Table of all possible **Settings** for this feature, and the **Values** necessary to specify in the **Command(s)**.  
An (\*) indicates that the interpretation of a value is subject to some restriction.
3. Dependencies/Constraints, other remarks
4. (for each Printer language and each related Command):
  - a. Tag (this is used to clearly mark where the Command is located in the device type)
  - b. Command syntax (see Appendix 1 below for general information on the printer language)
  - c. Initial command (as an example, and as it is shipped in the device type)

The entire initial command sequence of a particular device type is listed in the corresponding Volume 2.

#### **Note: (Print controls)**

For some of those features that can be specified per page, paragraph, or character, Print controls are defined. Where applicable, these are also listed in the Settings/Values table of the feature.

#### **General remarks:**

- The order in which the commands appear in the device type, and in which they are sent to the printer, is roughly the same as the one generated by our Windows drivers. To make sure the controller doesn't get problems, this order should be maintained. Please also note that some commands are sent automatically by the SAPscript driver, on which we cannot take any influence.
- Be aware that some settings may require modifications in more than 1 place !

#### **SAP-specific syntax issues:**

- A " #" at the beginning of a line is the SAP comment symbol. It means that the line will not be sent to the printer.
- Non-printable characters have to be entered as SAP escape characters.

#### **Notation conventions:**

- All commands are printed in fixed-spaced Courier font.
- The "^^^" indicates a place-holder for a value that has to be looked up from the Settings/Values table.
- <...> indicates a place-holder.
- A "###" in front of a line is to indicate that it should never be uncommented.
- [...] indicates optional text that can be omitted.

### **3.1 Input Bin**

#### **Description:**

Specify the input bin from where to take the paper.

#### **Settings/Values:**

^^^ [PCL.01]	Print control	Interpretation	Capacity (# sheets)
0	TRYST	Print out current page from currently active input bin (remains	--

		unchanged)	
7	--	Auto Tray Select	--
2	TRYMN	Bypass Tray (for sheet paper)	100
3	TRYME	Bypass Tray (for envelopes)	
8	TRY01	Tray 1	550
1	TRY02	Tray 2 -- if [Paper Feed Unit is installed]	550
4	TRY03	Tray 3 -- if [second Paper Feed Unit is also installed]	550

**Dependencies/Constraints:**

- For the paper sizes supported by a particular bin, please see the corresponding Operating Instructions manual.
- In all trays only SEF paper feed direction is supported.

**Note:** (Using the HPL2 ABAP list driver)

When using the HPL2 ABAP list driver, the PCL command for this setting will not become effective. You need to use the SAP mechanism to specify the Input Bin.

**Note:** (The SAP mechanism to specify the Input Bin)

- For ABAP & SmartForms:**

Under SAP this setting can also be specified in the definition of the Output device.

The "Output attributes for list drivers" tab has a setting named "Paper tray".

The selectable values "Tray 1" | ... | "Tray 10" | "Single sheet" | "Envelopes" | "ManualEnvelope",

correspond to the Print controls TRY01 | ... | TRY10 | TRYMN | TRYEN | TRYME.

This setting is only used by the HPL2 ABAP list driver.

If the standard ABAP list driver is used, the setting has to be specified in the command at [PCL.01] in the "Printer initialization" action in the Device type.

- For SAPscript:**

The TRYxx print control to be used for a particular page can be specified in the definition of the Form used by the document, under "Page layout" -> <page> -> [Attributes] -> "Print attributes" -> "Resource name".

**Note:** (Forcing a particular Input bin for SAPscript)

As explained above, the desired input bin for SAPscript can be specified in the "Resource name" field of the definition of the SAPscript FORM. If it is not desired to assign a fixed input bin to a SAPscript FORM, then this field should be left empty, and the desired input bin should rather be specified in the "Printer initialization" action of the Device type, at tag [PCL.01]. This is, however, only possible if the SAPscript FORM does not specify an input bin yet. If the SAPscript FORM does already specify an input bin that is undesired, and if it cannot be changed, please contact Technical support for how to override it.

**Note:**

This command can NOT be used to specify the input bin for transparencies in connection with the slip sheet function. Instead, it needs to be commented out, and the PCL commands DOCBODYTRAY [PCL.20c] and possibly TRAY [PCL.20d] have to be used.

**3.1.1 Tag: # [PCL.01] INPUT BIN****Command syntax:**

- \e&l^^^H

**Initial / Example:**

- #\e&l7H

**3.2 Paper Type****Description:**

Paper type (Media type) should be configured for two reasons:

- Different paper quality and thickness may require a different fusing temperature. This is called **Fuser control**.
- The device keeps track of which paper type is contained in each input bin. When a certain paper type is specified in the print job, the controller can automatically select an appropriate input bin containing the requested paper type and paper size.

Both features can be configured through either the PCL command (preferred) or the PCL MEDIATYPE command.

**Settings/Values:**

^^^ [PCL.04a/b]	^^^ [PCL.12]	Print control	Interpretation
PLAIN	6WdPlain	ZTPLN	Plain / Normal paper
PLAINORRECYCLED	--	--	Plain / Normal paper or recycled paper
TRANSPARENCY	13WdTransparency	ZTTRS	Transparency/OHP sheet
SPECIAL	8WdSpecial	ZTSPC	Special paper1
SPECIAL2	9WdSpecial2	--	Special paper2
SPECIAL3	9WdSpecial3	--	Special paper3
THICK	6WdThick	ZTTHK	Thick1 paper
THICK2	7WdThick2		Thick2 paper
THIN	5WdThin	ZTTHN	Thin Paper
RECYCLED	9WdRecycled	ZTRCY	Recycled paper
COLOR	6WdColor	ZTCLR	Colored paper
LETTERHEAD	11WdLetterhead	ZTLTH	Letterhead paper
PREPRINTED	11WdPreprinted	ZTPRN	Preprinted paper

LABELS	7WdLabels	ZTLBL	Labels
COATED	7WdCoated	--	Coated paper
BOND	5WdBond	ZTBND	Bonds
CARDSTOCK	10WdCardstock	ZTCST	Cardstock
GLOSSY	7WdGlossy	ZTGLS	Glossy paper
PLAINDUPLEXBACKSIDE	20WdPlainduplexbackside	ZTPXB	Plain (Duplex Backside)
THICKDUPLEXBACKSIDE	20WdThickduplexbackside	ZTTXB	Thick1 (Duplex Backside)
THICKDUPLEXBACKSIDE2	21WdThickduplexbackside2	--	Thick2 (Duplex Backside)
ENVELOPE	9WdEnvelope	--	Envelope

**Dependencies/Constraints:**

- All Input bins are supporting these settings/values.

**3.2.1 Tag: # [PJL.04] PAPER TYPE 1/2****Command syntax:**

- @PJL SET FUSERCONTROL = ^^^ \r\n -- **[PJL.04a]** -- This command is NOT supported by this device.
- @PJL SET MEDIATYPE = ^^^ \r\n -- **[PJL.04b]**

**Initial / Example:**

- #@PJL SET FUSERCONTROL = PLAINPAPER \r\n
- #@PJL SET MEDIATYPE = PLAIN \r\n

**3.2.2 Tag: # [PCL.12] PAPER TYPE 2/2****Command syntax:**

- \e&n^^^

**Note:** The value ^^^ has the following structure: "<decimal length of keyword> W <keyword>"; the <keyword> starts with a "d".

**Initial / Example:**

- #\e&n6WdPlain

## 3.3 Duplex Mode

**Description:**

Duplex means printing on both sides of a sheet of paper.

Depending on the **Binding edge** (the edge of the page that would be used for binding the document), there are 2 different orientations of the rear page with respect to the orientation of the front page possible and necessary.

There are two different notions of indicating the binding edge.

- The notion of **Long-/Short-edge binding** is independent of the orientation of the contents of the pages.
- The notion of **Side (Left-edge) / Top binding** is related to the above through the orientation of the printout, as follows:

	Portrait	Landscape
Long-edge	Side	Top
Short-edge	Top	Side

**Settings/Values:**

^^^ [PJL.17a]	^^^ [PJL.17b]	^^^ [PCL.03]	Print control	Interpretation
OFF	--	0	SPMSI	Simplex
ON	LONGEDGE	1	SPMDU	Duplex, Long-edge binding
ON	SHORTEGE	2	SPMTU	Duplex, Short-edge binding (Tumble)

**Dependencies/Constraints:**

- Duplex is disabled for these Media types: OHP Transparency, Labels, Envelope, Coated paper, Plain(Duplex backside), Thick1 (Duplex backside), Thick1 (Duplex backside), Thick2, Thin, Envelope and Cardstock.
- Duplex is not possible with custom paper sizes.
- Switching between different duplex modes within a document is supported.
- Duplex is disabled when "Slip sheet printing" is active.

**Note:** (Using the HPL2 ABAP list driver)

When using the HPL2 ABAP list driver, the PCL command for this setting will not become effective. You need to use the SAP mechanism to specify the Duplex mode.

**Note:** (The SAP mechanism to specify the Duplex mode)

- For ABAP & SmartForms:

Under SAP this setting can also be specified in the definition of the Output device.

The "Output attributes for list drivers" tab has a setting named "Print mode".

The selectable values are: DEFAULT, SIMPLEX, DUPLEX, and TUMBLE DUPLEX.

This setting is only used by the HPL2 ABAP list driver.

If the standard ABAP list driver is used, the setting has to be specified in the command at [PCL.03] in the "Printer initialization" action in the Device type.

- **For SAPscript:**

The Duplex mode to be used for a particular page can be specified in the definition of the Form used by the document, under "Page layout" -> <page> -> [Attributes] -> "Print attributes" -> "Print mode".

The selectable values are: <empty>, "S", "D", "T".

**Note:** (Forcing a particular Duplex mode for SAPscript)

As explained above, the desired duplex mode for SAPscript can be specified in the "Print mode" field of the definition of the SAPscript FORM. If it is not desired to assign a fixed duplex mode to a SAPscript FORM, then this field should be left empty, and the desired duplex mode should rather be specified in the "Printer initialization" action of the Device type, at tag [PCL.03]. This is, however, only possible if the SAPscript FORM does not specify a duplex mode yet. If the SAPscript FORM does already specify a duplex mode that is undesired, and if it cannot be changed, please contact Technical support for how to override it.

### 3.3.1 Tag: # [PJL.17] DUPLEX MODE 1/2

These commands are not necessary.

**Command syntax:**

- @PJL SET DUPLEX = ^^^ \r\n -- [PJL.17a]
- @PJL SET BINDING = ^^^ \r\n -- [PJL.17b]

**Initial / Example:**

- #@PJL SET DUPLEX = ON \r\n
- #@PJL SET BINDING = LONGEDGE \r\n

**Note:** If both PJL command and PCL command are sent, the PCL setting takes precedence over the PJL setting.

### 3.3.2 Tag: # [PCL.03] DUPLEX MODE 2/2

**Command syntax:**

- \e&l^^^S

**Initial / Example:**

- #\e&l0S

## 3.4 Output Bin

**Description:**

The output receptacle (bin, tray) for the printed paper.

There is only 1 output bin for this device.

**Settings/Values:**

^^^ [PJL.16]		Print control	Interpretation	Capacity (# sheets)
UPPER			Copy Tray	250

### 3.4.1 Tag: # [PJL.16] OUTPUT BIN 1/2

**Command syntax:**

- @PJL SET OUTBIN = ^^^ \r\n

**Initial / Example:**

- #@PJL SET OUTBIN = xxx \r\n

**Note:** If both PJL and PCL commands are sent, the PCL setting takes precedence over the PJL setting.

### 3.4.2 Tag: # [PCL.02] OUTPUT BIN 2/2

This command is NOT supported by this device.

## 3.5 Job Offset

This feature is NOT supported by this device.



**3.5.1 Tag: # [PJL.13] JOB OFFSET**

This command is NOT supported by this device.

**3.6 Stapling**

This feature is NOT supported by this device.

**3.6.1 Tag: # [PJL.02] STAPLING MODE**

This command is NOT supported by this device.

**3.7 Punching**

This feature is NOT supported by this device.

**3.7.1 Tag: # [PJL.03] PUNCHING MODE**

This command is NOT supported by this device.

**3.8 Resolution****Description:**

By default, the horizontal and vertical printer resolution, in dots per inch (dpi), is 600 dpi.  
In case of memory or speed problems, or for draft prints, you may wish to switch to 300 dpi.  
If resolution is changed, the memory is reconfigured, and all downloaded fonts and PCL macros are lost.

**Settings/Values:**

^^^ [(*)]	Interpretation
600	600 dpi
300	300 dpi

**Note:** (\*): The same value must be set at both places !

**Dependencies/Constraints:**

- 300 dpi does not support Color mode.

**3.8.1 Tag: # [PJL.01] RESOLUTION 1/2****Command syntax:**

- @PJL SET RESOLUTION = ^^^ \n

**Initial / Example:**

- @PJL SET RESOLUTION = 600 \n

**3.8.2 Tag: # [PCL.14] RESOLUTION 2/2****Command syntax:**

- \e&u^^^D

**Initial / Example:**

- \e&u600D

**3.9 Copies****Description:**

Number of copies to print of this job.  
For example, for 4 copies of a 3-page document,

- **Uncollated** copies will appear as 1,1,1,1,2,2,2,3,3,3,3.
- **Collated** copies will appear as 1,2,3,1,2,3,1,2,3,1,2,3.

**Settings/Values:**

^^ = { 1, ..., 999 }

**Dependencies/Constraints:**

- Collation => requires either an internal Hard Disk unit or a minimum of 96 MB memory. Bypass Tray => no Collation
- Please note that this may conflict with some SAP Output Management System software.

**Note: (PCL/PJL)**

There are two PJL commands and one PCL command related to specifying the number of copies and the collation mode. Initially, both PJL commands are commented out, and the PCL command specifies 1 copy. If either PJL command is used, the other one and the PCL command need to be commented out to avoid conflicts. For Collated mode, the PJL QTY command is needed. For Uncollated mode, either PJL COPIES or the PCL command can be used. If both PJL and PCL commands are used, the PCL setting will override the PJL setting.

**Note: (Increasing the performance of network printers)**

It is possible to specify the desired number of copies directly in the print data stream, using one of the commands below. Since the spool system cannot know the contents of the data stream, it has to be told explicitly that N = 1, to avoid any conflict.

If a certain class of print jobs always requires the same fixed number of copies, the administrator may choose

1. to create a dedicated device type which sends the appropriate command, and
2. to tell his users to always keep N = 1 in the Print parameters dialog.

**Note:** The above does not work in conjunction with the HPL2 ABAP list driver, since it overrides this setting; it always forces only 1 copy.

**3.9.1 Tag: # [PJL.15] COPIES 1/2****Command syntax:**

- @PJL SET QTY = ^^ \r\n -- **[PJL.15a]** (for Collated)
- @PJL SET COPIES = ^^ \r\n -- **[PJL.15b]** (for Uncollated)

**Initial / Example:**

- #@PJL SET QTY = 1 \r\n
- #@PJL SET COPIES = 1 \r\n

**3.9.2 Tag: # [PCL.13] COPIES 2/2****Command syntax:**

- \e&l^^X

**Note:**

This PCL command will just print uncollated copies. It needs to be commented out if one of the above PJL commands is used.

**Initial / Example:**

- \e&l1X

**3.10 EconoMode (Toner Saver)**

This feature is NOT supported by this device.

**3.10.1 Tag: # [PJL.14] ECONOMODE (TONER SAVER)**

This command is NOT supported by this device.

**3.11 Auto Tray Change/Switching****Description:**

If enabled, and the current tray runs out of paper, the job will be continued from a tray containing the same paper size. If disabled, the front panel LCD will prompt the user to refill paper and wait. This should be disabled in case there are e.g. 2 different types of A4 paper (e.g. normal, colored) which should not be mixed.

**Settings/Values:**

^^^ [PJL.12]	Interpretation
OFF	disabled
ON	enabled

### 3.11.1 Tag: # [PJL.12] AUTOTRAYCHANGE

#### Command syntax:

- @PJL SET AUTOTRAYCHANGE = ^^^ \r\n

#### Initial / Example:

- #@PJL SET AUTOTRAYCHANGE = ON \r\n

## 3.12 Edge Smoothing/Enhancement

This feature is NOT supported by this device.

### 3.12.1 Tag: # [PJL.11] SMOOTHING

This command is NOT supported by this device.

## 3.13 Page Protection

This feature is NOT supported by this device.

### 3.13.1 Tag: # [PJL.06] PAGE PROTECTION

This command is NOT supported by this device.

## 3.14 Paper Size

#### Description:

Determines the paper size to be used for the current page.

The **physical height** and **width** of the sheet or envelope are specified below.

The engine's mechanics implies an unprintable area near the edges, so that the **imageable area** is usually smaller. This is device-dependent.

Paper may be treated differently, depending on with which edge the sheets are fed into the paper path (**feed direction**).

- **LEF** = Long-edge-feed
- **SEF** = Short-edge-feed

(This notion of feed direction is independent of the notion of orientation.)

In the paper sizes below the first value specified is the feed edge.

#### Note: (Configuring the Paper size)

This setting cannot be configured effectively in the "Printer initialization" action of the device type, because there are other mechanisms which would override it.

For a SAPscript document, its paper size is configured in the "Page format" setting in the SAPscript Form used by the document, which in turn determines the Device format to be used. For the SAP standard paper sizes (A3, A4, A5, Letter, Legal, Executive), the command sent is built in the HPL2 SAPscript OTF driver, otherwise (for non-standard paper sizes) it has to be specified at the end of the Printer initialization action of the corresponding Device format.

For an ABAP report, the paper size to be used is always assumed to be A4 or Letter; however, the "Printer initialization" action does not send any paper size command.

In any case, the command syntax is explained below.

#### Note: ("Sub paper size")

Normally, a print job specifying a certain paper size would require that paper of this size be loaded in a tray.

If paper of this size is not available in any tray, the user will be requested via the device's front panel to load it.

Since A4 and Letter have similar formats, it may be desirable to be able to print a job specifying Letter format on A4 paper, or vice versa. This feature is called "Sub(stitute) paper size". There is no scaling applied; so if the image is too large, it will be cropped at the margins.

This feature can only be set via the device's front panel (Sub Paper Size = Auto); there is no PJL command to achieve this.

#### Settings/Values:

^^^	Name (short)	Full / Alternative names	EU/US	Size
26	<b>A4</b>	DIN A4	EU	210 x 297 mm
2000 25	<b>A5</b>	DIN A5	EU	148 x 210 mm

2001	A6	DIN A6	EU	105 x 148 mm
45	B5	B5(JIS)	EU	182 x 257 mm
2020	B6	B6(JIS)	EU	128 x 182 mm
3	<b>Legal</b>	LGL, Legal	US	8.5" x 14"
2	<b>Letter</b>	LTR, Letter	US	8.5" x 11"
1	<b>Executive</b>	Executive	US	7.25" x 10.5"
2008	Statement	HLT, Half Letter	US	5.5" x 8.5"
2012	Folio	F4	US	8.25" x 13"
2011	F/GL	F, Folio GL	US	8" x 13"
2007	Foolscap	Foolscap, Folio, F4, Government Legal	US	8.5" x 13"
81	Com-10	Envelope Commercial #10	US	4.125" x 9.5"
80	Monarch	Envelope Monarch, Commercial #7 3/4	US	3.875" x 7.5"
90	DL	Envelope International DL (Designated Long)	EU	110 x 220 mm
91	C5	Envelope C5	EU	162 x 229 mm
2022	C6	Envelope C6	EU	114 x 162 mm
2031	16K	16Kai	EU/US	195 x 267 mm
101	Custom	Custom / User-defined	--	--

**Dependencies / Constraints:**

- In all trays only SEF paper feed direction is supported.
- If no paper select command is sent, the controller will use the paper in the addressed tray, or it may ask to load the paper which is currently specified as default.

**Note:** (Support of paper sizes by SAP)

Only the entries marked bold are currently fully supported as standard under SAP.

For the procedure on how to support a non-standard paper size, see the corresponding section in Volume 2, Appendix 1.

**Note:** (Printing envelopes)

To print an envelope, you need to specify these commands:

- (Input bin): The command for the Envelope Feeder or the Bypass tray.
- (Paper size): The command indicated in this section.
- (Orientation): Please note that all envelope sizes require Landscape orientation.

**Command syntax:**

- \e&l^^^A

**Example:**

- \e&l26A

## 3.15 Orientation

**Description:**

The orientation defines how the printed output appears on the physical paper. By definition, "Portrait" means that, in order to read the text, the sheet must be held upright, i.e. with the short edge at the top. (This notion is independent of the notion of paper feed direction.)

**Note:** (Configuring the Orientation)

This setting cannot be configured effectively in the "Printer initialization" action of the device type, because there are other mechanisms which would override it.

For a SAPscript document, its orientation is configured in the "Orientation" setting in the SAPscript Form used by the document. The command is automatically sent by the HPL2 SAPscript OTF driver, using the Print controls SPORT and SLAND, after the command sequence of the "Printer initialization" action. Therefore, the "Printer initialization" action should not send any commands to specify orientation.

For an ABAP report, the orientation is a property of the Device format (X\_IL\_cc), which in turn is determined by the number of lines per page and the number of columns. The necessary PCL command is contained at the end of the "Printer initialization" action.

In any case, the command syntax is explained below.

**Settings/Values:**

	^^^	Interpretation
	0	Portrait (P)
	1	Landscape (L)

**Note:** The values are the digits 0,1, NOT the letters O,I.

**Dependencies/Constraints:**

- For Stapling, Punching, Duplexing, Orientation, and Paper feed direction, only certain combinations make sense and are permitted. See the chapter "Limitations" below.

**Command syntax:**

- \e&l^^^O

**Note:** The last character is the uppercase letter "O".

**Example:**

- \e&l00

### 3.16 Left margin

**Description:**

The left margin of the page.

**Note:** (Configuring the Left margin)

This setting cannot be configured effectively in the "Printer initialization" action of the device type, because there are other mechanisms which would override it.

For a SAPscript document, the horizontal margins are automatically cleared (set to 0) by the HPL2 SAPscript OTF driver, sending the command "<ESC>9" after the command sequence of the "Printer initialization" action.

For an ABAP report, the horizontal margins are automatically cleared (set to 0) when using the HPL2 ABAP list driver. Otherwise no command is sent.

In any case, the command syntax is explained below.

**Settings/Values:**

AAA	Interpretation
{ 0,1,... }	Number of columns (as defined by the current HMI)

**Command syntax:**

- \e&a^^^L

**Example:**

- \e&a5L

### 3.17 Top margin

**Description:**

The top margin of the page.

**Note:** (Configuring the Top margin)

This setting cannot be configured effectively in the "Printer initialization" action of the device type, because there are other mechanisms which would override it.

For a SAPscript document, the top margin is automatically cleared (set to 0) by the HPL2 SAPscript OTF driver, sending the command "<ESC>&l0E" after the command sequence of the "Printer initialization" action.

For an ABAP report, the top margin is automatically cleared (set to 0) when using the HPL2 ABAP list driver. Otherwise no command is sent.

In any case, the command syntax is explained below.

**Settings/Values:**

AAA	Interpretation
{ 0,1,... }	Number of lines (as defined by the current VMI)

**Command syntax:**

- \e&l^^^E

**Example:**

- \e&l1E

### 3.18 Horizontal spacing

**Description:** (PCL)

The horizontal spacing defines the distance between two adjacent characters.

In a proportional font, it affects only the width of the space character.

The current horizontal spacing is kept in a variable called **HMI** (Horizontal Motion Index).

It has to be specified as an absolute measure in 1/120 inch.

This determines the number of characters per inch (**cpi**).

The default HMI is  $= 12/120" = 10 \text{ cpi}$ .

**Note:** (Configuring the Horizontal spacing)

This setting cannot be configured effectively in the "Printer initialization" action of the device type, because there are other mechanisms which would override it. Moreover, after any font select command the HMI is automatically set to a (font-specific) default, and therefore it needs to be specified again.

For a SAPscript document, the horizontal spacing is specified by the HPL2 OTF driver automatically after each font select command of a proportional font (thus only affecting the width of the space character). For fixed-spaced fonts, no command is sent; thus the default pitch of the selected font will be used.

For an ABAP report, the "Printer initialization" action of an X\_II\_cc Format contains a command to override the default pitch of the font used (Courier), thus condensing or expanding it to just the right size so that cc columns will fit properly on the page. The HPL2 ABAP list driver sends the command automatically.

In any case, the command syntax is explained below.

**Settings/Values:**

AAA	Interpretation
{ <any rational number> }	absolute measure in 1/120 inch

**Command syntax:**

- \e&k^^H

**Example:**

- \e&k12H

### 3.19 Vertical spacing

**Description:** (PCL)

The vertical spacing defines the distance between two adjacent lines.

The current vertical spacing is kept in a variable called **VMI** (Vertical Motion Index).

It can be specified as number of lines per inch (**lpi**).

The default VMI is = 8/48" == 6 lpi.

**Note:** (Configuring the Vertical spacing)

This setting cannot be configured effectively in the "Printer initialization" action of the device type, because there are other mechanisms which would override it.

For a SAPscript document, the vertical spacing is initially set to 0 by the HPL2 SAPscript OTF driver, using the command "<ESC>&10C".

For an ABAP report, the necessary command is contained at the end of the "Printer initialization" action of the format. The HPL2 ABAP list driver overrides this, setting it to 0.

In any case, the command syntax is explained below.

**Settings/Values:**

AAA	Interpretation
{ 1,2,3,4,6,8,12,16,24,48 }	number of lines per inch (lpi)

**Command syntax:**

- \e&l^^D

**Example:**

- \e&l6D

### 3.20 Character set

**Description:**

Select/change the active printer character set.

This term is also known as "symbol set" (HP) or "code page" (Microsoft).

It is a table that interprets ASCII codes as characters.

**Note:** (Configuring the Character set)

This setting is not a property of the job or a page but of individual characters. Nor is it an attribute of the font, it is maintained independently. It would make sense to specify an initial value in the "Printer initialization" action of the device type, but it could be overridden at any time.

In a SAPscript document, the character set can be switched by sending an appropriate Print control. (This is currently not implemented.)

This setting is also overridden by the SFxxx font select Print controls issued by the HPL2 SAPscript OTF driver.

For an ABAP report, the initial character set to be used is specified at the end of the "Printer initialization" action.

In any case, the command syntax is explained below.

**Settings/Values:**

AAA	Interpretation
0N	Latin-1 (ISO 8859-1)
2N	Latin-2 (ISO 8859-2)

For the initial setting, see the Example below.

**Dependencies/Constraints:**

- none

**Note:** (Switching the Character set)

At the moment it is not possible to switch between character sets, e.g. to mix both Latin-1 and Latin-2 in the same document.

**Note:** (Support of the EURO character)

The EURO character (€) has been implemented in the symbol sets 19U (Latin-1), 9E (Latin-2), for most typefaces, except LinePrinter, at position 80 (hex).

For this device the resident fonts support the EURO character.

To find out if the device type supports the EURO character, please see Volume 2.

**Command syntax:**

- \e(^^^

**Example:**

- \e( 0N -- for ZA0x1vvv
- \e( 2N -- for ZA0x2vvv

## 3.21 Font

**Description:**

Selects the font to be used, by specifying the following parameters:

- <sup>^^p</sup> = proportional
- <sup>^^h</sup> = pitch (cpi)
- <sup>^^v</sup> = font height (point size)
- <sup>^^s</sup> = style (italic)
- <sup>^^b</sup> = weight (bold)
- <sup>^^T</sup> = typeface

**Note:** (Selecting a font & Configuring font attributes)

This setting is not a property of the job or a page but of individual characters.

It doesn't make sense to specify an initial value in the "Printer initialization" action of the device type, since it will be overridden.

In a SAPscript document, the font to be used for a portion of text is specified by preceding the text with a 2-character tag which is defined as a Character format or Paragraph format in the Form or Style used by the document. The tag maps to a system font and thus to a SFxxx Print control and thus eventually to a font select PDL command sequence.

For an ABAP report, only a fixed-spaced font can be used, in this case COURIER. The font size depends on the format chosen, and it is specified in the "Printer initialization" action of the Device format. The HPL2 ABAP list driver has its own mechanism.

In any case, the command syntax is explained below.

There are no Print controls for changing/specifying a font attribute, because using them would conflict with the existing mechanisms.

**Note:** (OCR text printing)

Printing OCR text requires a separate solution. Please refer to the chapter "Barcodes & OCR Text" in Volume 2 for more information.

**Note:** (Barcode printing)

Printing barcodes requires a separate solution. Please refer to the chapter "Barcodes & OCR Text" in Volume 2 for more information.

**Note:** (Arbitrary size fonts)

For printing fonts in arbitrary sizes, please refer to the chapter "The Fonts" in Volume 2 [ZA0x].

**Settings/Values:**

Please refer to proper PCL documentation.

**Note:** The pitch command (<ESC>&k#H) must be respecified after any font select command. Otherwise a (font-specific) default is used.

**Note:** LinePrinter supports only symbol sets 0N, 2N.

**Command syntax:**

- \e(s<sup>^^p</sup>h<sup>^^h</sup>v<sup>^^v</sup>s<sup>^^s</sup>b<sup>^^b</sup>T

**Example:**

- \e(s0p10h12v0s0b4099T -- This would select normal Courier 10 cpi 12 pt.

## 3.22 Color printing

**Description:**

There are several parameters which can influence the appearance of color images and text.

- Color/Monochrome mode

**Settings/Values:**

-- see below

**Dependencies/Constraints:**

- Color mode is not supported with resolution 300 dpi.

-- see below

**Note:** (How to specify Text color)

In ABAP, the colors are predefined. In SAPscript, the color of text can be specified as follows:

- For R/3 release 4.6C+, the SmartForms component allows to specify color as an attribute of characters.

- Otherwise, the proprietary Print controls below can be used with this syntax:

```
/:PRINT-CONTROL 'ZCxxx'
```

Print control	Color
---------------	-------

-- direct (*)	-- indexed (*)	
ZCBLU	ZCXX4	Blue
ZCRED	ZCXX1	Red
ZCCYA	ZCXX6	Cyan
ZCYLW	ZCXX3	Yellow
ZCGRN	ZCXX2	Green
ZCBLK	ZCXX0	Black
ZCMGT	ZCXX5	Magenta
ZCWHT	ZCXX7	White

**Note: (\*)**

The direct method specifies RGB values.

The indexed method uses a standard 8-color palette. This method may fail, because the SAPscript OTF driver may change the palette, mapping some colors to Black.

### 3.22.1 Tag: # [PCL.30] COLOR : COLOR MODE

**Description:**

This setting determines whether the subsequent output should be monochrome (black-and-white) or color.

**Note: (Switching the color mode within a document)**

It is possible to switch between the two modes within a SAPscript document.

However, this command always requires a page break, because it affects not only the toner to be used but also the format of the rasterized page bitmap. Therefore, it needs to be immediately preceded by a form feed, as follows:

```
/:NEW-PAGE
(
/:PRINT-CONTROL 'SESCP'
&b0M
```

**Command syntax:**

- \e&b^^^M

**Settings/Values:**

^^^ [PCL.30]	Print control	Interpretation
0	ZCLR1	Color
1	ZCLR0	Monochrome (Black-and-white)

**Initial / Example:**

- #\e&b0M

## 3.23 Slip sheet

**Description:**

This feature allows you to insert a sheet of paper between two consecutive sheets of transparency, thus preventing them from sticking together. The contents and the input bin of the slip sheets can be specified.

**Note:**

Normally transparencies are only A4 or LTR size.

The slip sheets should have the same paper size and feed direction as the transparencies, but come from a different tray.

**Settings/Values:**

^^^ [P.JL.20a]	Interpretation
OFF	no slip sheet
BLANK	inserts a blank page

^^^ [P.JL.20b,c,d]	Interpretation
TRAY1	get the sheet from Tray 1
TRAY2	get the sheet from Tray 2
TRAY3	get the sheet from Tray 3
BYPASS	get the sheet from the Bypass

**Dependencies/Constraints:**

- [P.JL.20b,c,d] are only interpreted if [P.JL.20a] is not "OFF".
- In that case, a document in Duplex mode will automatically be printed in Simplex mode.

**Note:**

It is highly recommended to set the Paper Type to "Transparency" with the command [PCL.12], in order to prevent the device from damage. (The fuser temperature must be lowered for printing transparencies.)



**Note:**

The PJJ SLIPSHEETPRINTTRAY command [PJJ.20b] specifies the source tray for the slip sheets.

To specify the input tray for the transparencies, the PJJ DOCBODYTRAY command [PJJ.20c] and the PJJ TRAY command [PJJ.20d] must be used, both with the same value. Moreover, the [PCL.01] INPUT BIN command must be commented out.

**Note:**

The trays indicated in SLIPSHEETPRINTTRAY, DOCBODYTRAY and TRAY should contain the same paper format in the same feed direction.

**3.23.1 Tag: # [PJJ.20] SLIPSHEET****Command syntax:**

- @PJJ SET SLIPSHEETPRINT = ^^^ \r\n -- [PJJ.20a]
- @PJJ SET SLIPSHEETPRINTTRAY = ^^^ \r\n -- [PJJ.20b]
- @PJJ SET DOCBODYTRAY = ^^^ \r\n -- [PJJ.20c]
- @PJJ SET TRAY = ^^^ \r\n -- [PJJ.20d]

**Initial / Example:**

- #@PJJ SET SLIPSHEETPRINT = OFF \r\n
- #@PJJ SET SLIPSHEETPRINTTRAY = TRAY1 \r\n
- #@PJJ SET DOCBODYTRAY = BYPASS \r\n
- #@PJJ SET TRAY = BYPASS \r\n

**3.25 Edge-to-Edge Mode**

This feature is NOT supported by this device.

**3.25.1 Tag: # [PJJ.07] EDGE-TO-EDGE MODE**

This command is NOT supported by this device.

**3.26 USERCODE****Description:**

The USERCODE feature allows to tag a print job with a numeric code which identifies the job as having been issued by a certain individual (user) or organizational unit (department, etc.).

This can be used for accounting or billing purposes, for usage statistics, or for user authentication.

For how to register the codes on the devices and how to evaluate the statistics, refer to the corresponding Operating Instructions manual.

**Settings/Values:**

The length of the code is max. 8 digits.

The surrounding double-quotes (") are mandatory.

The value of the code can be specified as static/fixed or as dynamic/variable.

In our ZAxX Device type, initially a fixed value is specified as an example.

For how to assign variable codes dynamically at print time, please contact technical support.

**Dependencies/Constraints:**

- If the value is too long (> 8 digits), it will not be truncated, but the parameter will be empty !
- If the value contains an invalid character, i.e. a non-digit, the parameter will be empty !

**3.26.1 Tag: # [PJJ.24] USERCODE****Command syntax:**

- @PJJ SET USERCODE = "<usercode>" \r\n

**Initial / Example:**

- #@PJJ SET USERCODE = "01234567" \r\n

**4. Limitations**

There are no device-specific or controller-specific limitations related to combinations of several features.

For **device-specific limitations of a single feature**, see under "Dependencies/Constraints" of the corresponding section above.

For **device-independent limitations** related only to the SAP device type used, please refer to the "Limitations" chapter of the corresponding Volume 2.

## 5. (Appendix 1): Printer Languages

This chapter gives a brief introduction of each printer language used by the printer controllers of our devices.

### 5.1 PCL

The HP **PCL Printer Language** (PCL) is a **page description language** (PDL). That means it is used to specify the contents and format of a page.

The general syntax of a PCL command is:

- <ESC> <character> <letter> <value> <letter>

**Note:**

- Please be aware that the syntax is case-sensitive.
- In "\e&l^^^H" etc., "l" is the lowercase letter "L" not the digit "1" !
- In "\e&l^^^O" etc., "O" is the uppercase letter "O" not the digit "0" !
- Do NOT introduce any extra blanks.

**PCL5e** is the version that most of our black-and-white devices use.

**PCL5c** is the version that our color devices use.

For detailed information, please refer to the "PCL5 Printer Language Technical Reference Manual" from HP.

#### 5.1.1 PCL macros

PCL allows to define and execute **macros**. A macro is identified by a number (<#>).

- <ESC>&f<#>y0X                      start define macro #
- <ESC>&f<#>y1X                      stop define macro #
- <ESC>&f<#>y2X                      execute macro #
- <ESC>&f<#>y3X                      call macro #

### 5.2 PJP

The HP **Printer Job Language** (PJP) is a **job control language**.

That means it controls parameters of a whole job, not of individual pages.

Normally all PJP commands are sent at the beginning of a job, and then it switches to some page description language.

The general syntax of a PJP command is:

- @PJP SET <keyword> = <value> [<CR>]<LF>

**Note:**

- Please be aware that the syntax is case-sensitive.
- The white spaces in front of and behind the "=" sign are optional.
- Do NOT introduce any blanks behind the <CR><LF>.

For detailed information, please refer to the "PJP Technical Reference Manual" from HP.