

MULTIFUNCTIONAL LED PRINTER

Print Data Converter Function Guide

Rev. 1.00

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1. OVERVIEW

This chapter describes the overview of Print Data Converter.

1-1. Support Information

Print Data Converter is supported by MC7 series, MB7 series, MC9 series, and ES and MPS models of those series.

1-2. What is Print Data Converter?

Print Data is composed of PJP (optional) and PDL.

PJP (Printer Job Language) : used for job-level printer control/Printer configuration/etc (e.g. Staple)

PDL (Page Description Language) : used for page-level control/image data/etc (e.g. Page Size)

Print Data Converter is the function that allows MFP to replace/add/remove the PJP and PDL of print job before job processing.

The purpose of this function is:

to fix some print problem tentatively (without ROM update)

to provide some solutions of printing function for the customer demand

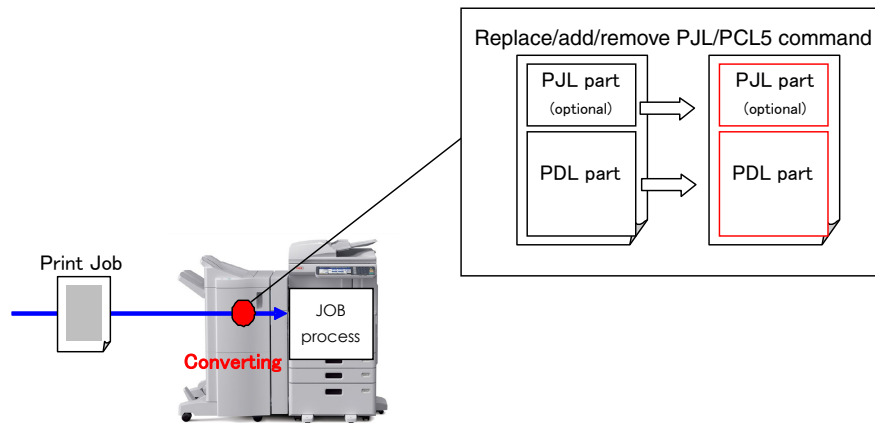


Fig.1-1

Usage example:

PJP

- Remove specific string from Job Name which will be shown in Job Log ("Microsoft Word - TEST.doc" -->"TEST.doc")
- Force Monochrome print (by changing PJP string - @PJPRENDERMODE=COLOR -->GRAYSCALE)
- Force Hold Print (@PJPPRINTMODE=NORMAL -->HOLD)

PDL (PCL5 command)

- Repair incorrect command to prevent unexpected output
(Replace incorrect A4 size command - "Ec&(26A" with "Ec&I26A")
- Force PaperSource Auto selection (Replace any cassette command "Ec&I#H" with AUTO command "Ec&I7H")
- Replace Paper related command - Size / Duplex / Source / etc...

See more details in Appendix B - changeable parameters.

Notes

As Print Data Converter changes incoming print data, be aware of the risk that unexpected result may occur. To reduce the risk, limiting applied users using additional LPR queue is STRONGLY recommended.

(No definition / defining default LPR queue ("Print") to 'Queue' element is not recommended because almost incoming print data will be converted.)

1-3. Function Overview

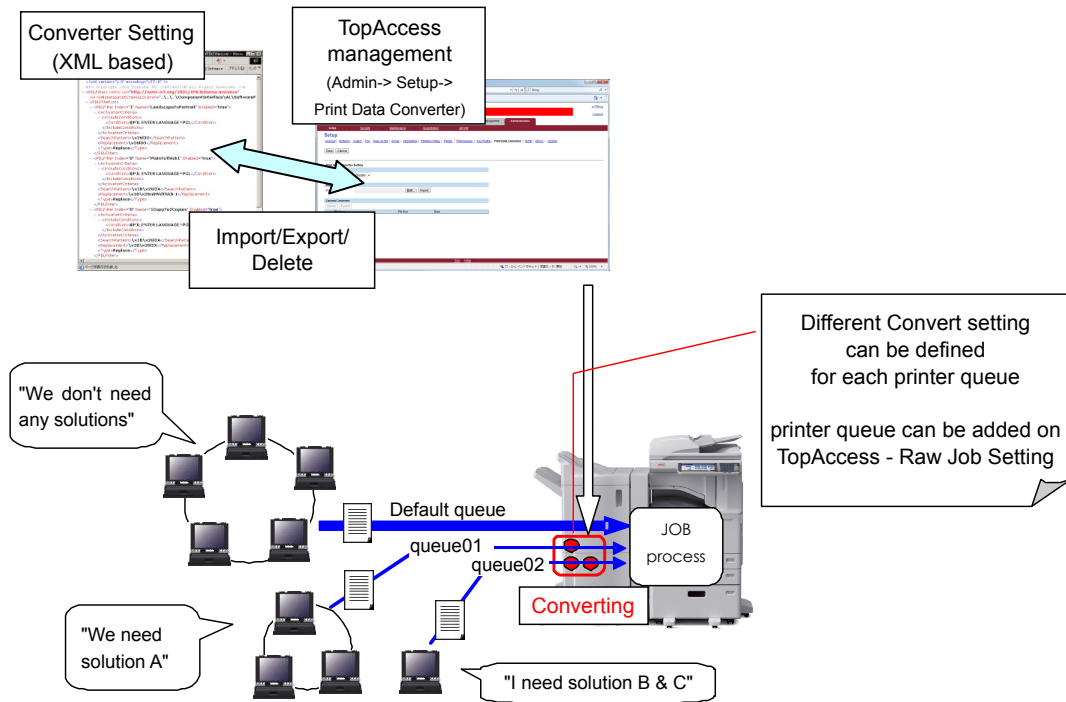


Fig.1-2

- Print Data Converting definition (rule) must be described in XML format.
- Print Data Converter file can be created by Service Technicians.
- Print Data Converter file can be imported/exported/deleted via TopAccess.
- Print Data Converter function can be Enabled/Disabled on TopAccess.
- One MFP can import only one XML file.
- One XML file can include multiple convert definitions.
- Limiting Print Data Converter effect to the specified user(s) is possible using Print queue definition.

1-4. Print Data Converter support target

Print Data Converter supports the following conditions.

Table.1-1

Language of Print Job	PJL Conversion	PDL conversion
PCL5 / PCL5c	Yes	Yes
PCL6	Yes	No
PS	Yes	No
XPS	N/A	No

*PCL5/PCL5c is not supported by Printer Driver. Legacy environment is assumed.

*PJL is the optional command. Print Job may not contain PJL. It is depend on print environment.

*Printer Driver always contents PJL command except XPS.

2. How to apply Print Data Converter

This chapter describes how to setup and apply Print Data Converter

2-1. Print Data Converter Application flow

- 1) Analyze user's issue (problem) / Investigate user's demand (request)
- 2) Analyze actual print data
- 3) Create xml file which will fix the issue / satisfy user's demand
- 4) Testing with created xml file
- 5) Install xml file via TopAccess and setup user's print environment

Basically 1) to 5) should be done by Service Technician but only 5) is acceptable to be done by User's Administrator. (TopAccess)

Notes

XML file is not installed in MFP by factory default to prevent print data crush by User Administrator's wrong usage.

2-2. Create Print Data Converter XML file

Print Data Converter XML file can be created using text editor (i.e. Windows NOTEPAD), XML editor (i.e. Microsoft XML Notepad) and so on.

2-2-1. Sample XML file

Following is the sample of XML file

```
<?xml version="1.0" encoding="UTF-8"?>
<PDConverters>
  <PDConverterList>
    <PDConverter Index="0" Name="PJLForceMonochrome" Enabled="true">
      <LanguageType>PJL</LanguageType>
      <SearchPatterns>
        <SearchPattern>@PJL COMMENT DSSC PRINT RENDERMODE=*</SearchPattern>
      </SearchPatterns>
      <Replacement>@PJL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE</Replacement>
      <OperationType>Replace</OperationType>
      <AssociatedQueues>
        <Queue>MonoPrintQue</Queue>
      </AssociatedQueues>
    </PDConverter>
    <PDConverter Index="1" Name="PCLReplaceLTLDtoA4" Enabled="true">
      <LanguageType>PCL</LanguageType>
      <SearchPatterns>
        <SearchPattern>\x1B\x2612A</SearchPattern>
        <SearchPattern>\x1B\x2616A</SearchPattern>
      </SearchPatterns>
      <Replacement>\x1B\x26126A</Replacement>
      <OperationType>Replace</OperationType>
      <AssociatedQueues>
        <Queue>LTLDtoA4que</Queue>
      </AssociatedQueues>
    </PDConverter>
  </PDConverterList>
</PDConverters>
```

Above sample XML contents two converter settings. (Red and Blue)

- 1) Force Monochrome print to the job which is sent via "MonoPrintQue" LPR queue.
- 2) Change the page size from LT/LD to A4 for PCL5 job which is sent via "LTLDtoA4que" LPR queue

2-2-2. Overview of XML description

- One XML file can define MULTIPLE settings (*Index* starts from 0).
- Each setting can be enabled/disabled in XML file (*Enabled*="true"/"false").
- Need to define PJJ or PCL for *LanguageType* to clarify the target (Controller's behavior will change depend on this setting).
- MULTIPLE *SearchPattern* can be defined.
- Wildcard can be used for *SearchPattern* ("*" for PJJ, "#" for PCL and "?" for both *LanguageType*).
- Printer Queue can be defined. Limiting the user by Printer Queue will reduce the risk of crash or invalid print result by unexpected conversion.

Notes

- An escape sequence must be entered as a backslash followed by an 8-bit hexadecimal number, e.g. "\x1B" for [ESC] , "\x0D" for [CR] or "\x0A" for [LF].
- The ampersand, the left and right angle brackets must be entered as escape sequences "\x26", "\x3C" and "\x3E" respectively, since they are not allowed as literals in an XML document. (e.g. PCL5 page size A4 command "Ec&l26A" should be defined as "\x1B\x26l26A")

2-2-3. XML description details

Table.2-1

Element/Attribute	type		comment
Index	<i>integer</i>	<i>mandatory</i>	Converter index (should starts from 0)
Name	<i>string</i>	<i>optional</i>	Converter name
Enabled	<i>boolean</i>	<i>mandatory</i>	"true" or "false" If "true", the setting will be enabled. If "false", the setting will be disabled.
LanguageType	<i>string</i>	<i>mandatory</i>	"PJJ" or "PCL" Types of language to convert "PJJ": Select when converting PJJ. (Only PJJ part will be the target of converting.) "PCL": Select when converting PCL5 command. (PJJ part will be skipped for converting.)
SearchPattern	<i>string</i>	<i>optional</i>	Define the string to search. (PJJ or PCL5 command) Multiple SearchPattern can be defined in SearchPatterns element. Wildcard can be used. (see details in Appendix A)
Replacement	<i>string</i>	<i>mandatory</i>	Define the string to convert/newly add.
OperationType	<i>string</i>	<i>mandatory</i>	"Replace", "InsertBefore", "InsertAfter" or "InsertAtBeginning" "Replace": the string defined in "SearchPattern" will be replaced by the string defined in "Replacement". "InsertBefore": the string defined in "Replacement" will be inserted before the string defined in "Replacement". "InsertAfter" : the string defined in "Replacement" will be inserted after the string defined in "Replacement". "InsertAtBeginning": the string defined in "Replacement" will be inserted at the beginning of print data.

Element/Attribute	type		comment
EndSequence	<i>string</i>	<i>optional</i>	Stop converting when received defined command/string in the incoming print data stream. This definition is to reduce the risk of performance/unexpected converting. Multiple EndSequence can be defined in EndSequences element. Note that an escape sequence cannot be defined as EndSequence.
Queue	<i>string</i>	<i>mandatory</i>	Print queues to which the converter is associated. Apply the converter to any queues if not specified. At least one queue must be specified when OperationType=="InsertAtBeginning" Multiple Queue can be defined in AssociatedQueues element.

2-3. Setting up LPR queue

This chapter describes how to add LPR queue to the MFP.

Notes

As Print Data Converter changes incoming print data, be aware of the risk that unexpected result may occur. To reduce the risk, limiting applied users using additional LPR queue is STRONGLY recommended. On this understanding, if default queue is preferred to apply Print Data Converter, define default print queue "Print" in 'Queue' element.

2-3-1. Adding an LPR queue via TopAccess

- 1) Access TopAccess in the administrator mode.
- 2) Click the [Setup] menu and [Printer] submenu.
- 3) To add a new LPR queue, click [Add] in Raw Job Setting.

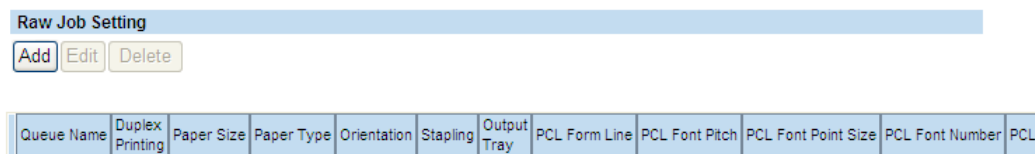


Fig.2-1

- 4) Enter the queue name using up to 31 alphanumeric characters. The queue name is case sensitive so that "Queue1" and "queue1" will be added as different queues.
- 5) Set up other items (See details in TopAccess Guide - Setting up Raw Job Setting)
- 6) Click [Save].

For example of sample XML in 2-2-1, two LPR queue should be created, such as "MonoPrintQue" and "LTLDtoA4que".

Notes

In Raw Job Setting, you can add up to 16 LPR queue names and specify the raw job setting for each queue.

2-3-2. Changing LPR queue on user's environment

To print via created queue from user's environment, setting up LPR queue is needed on user's environment.

For example of Windows OS,

- 1) Open Printer Driver property and select [Ports] tab
- 2) Click [Configure Port...]
- 3) Select [LPR] at the [Protocol] group, enter queue name (For example "MonoPrintQue" for sample XML in 2-2-1.) in the [Queue Name] box at the [LPR Settings] group, and then click [OK].

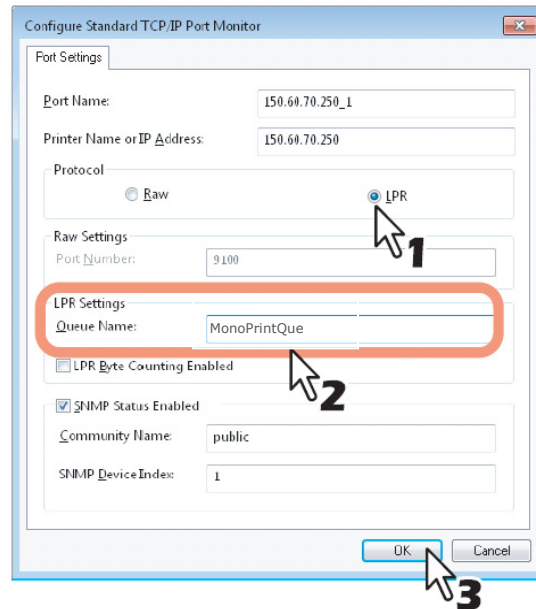


Fig.2-2

For other environment, please see "Software Installation Guide"

2-4. Setting up Print Data Converter XML file from TopAccess

Print Data Converter XML file can be imported/exported/deleted by TopAccess. This chapter describes how to do it.

2-4-1. Accessing TopAccess in the administrator mode

- 1) To navigate to TopAccess, enter the following URL on the address box of your Internet browser.
http://<IP Address> or http://<Device Name>
- 2) The TopAccess web page opens
- 3) Click the [Administration] tab
- 4) Enter the Administrator user name and password. Then click [Login]

2-4-2. Setting up Print Data Converter

- 1) Click the [Setup] menu and [Print Data Converter] submenu.
- 2) In the Print Data Converter submenu page, set the Print Data Converter settings as required.

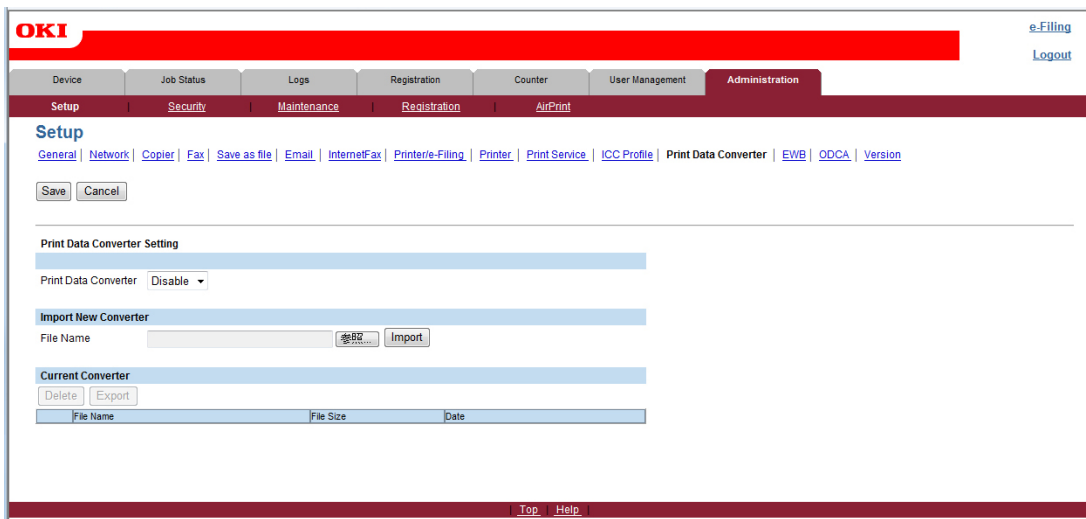


Fig.2-2

2-4-3. Import New Converter

- 1) Click [Browse] in [Import New Converter] to select the Converter (xml file), and then click [Import].
- 2) The Converter is imported. Imported file is shown as "Current Converter".

Notes

Only one Converter can be imported.

If trying to import Converter when Converter is already imported, existing file will be overwritten by new Converter.

(Confirmation dialog will be shown)

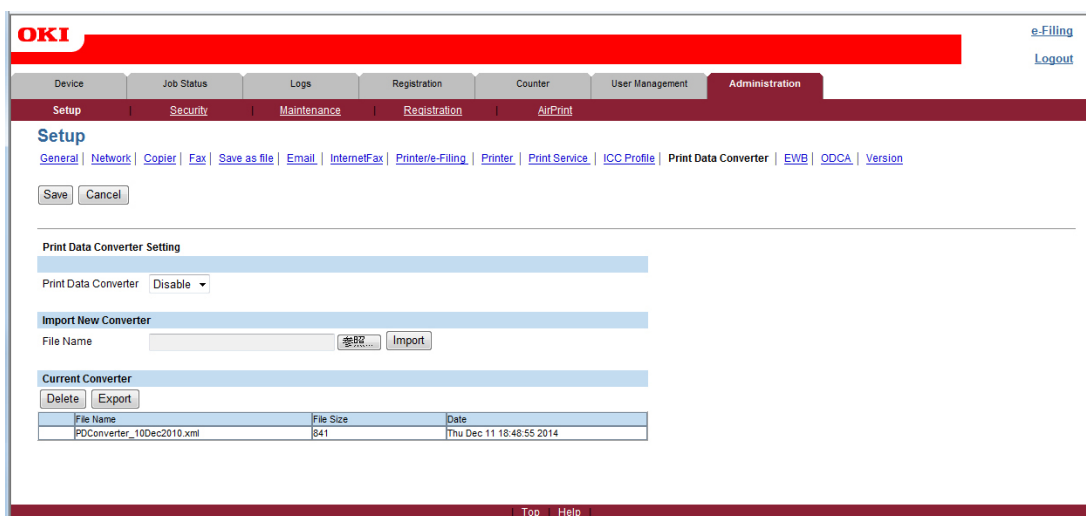


Fig.2-3

2-4-4. Enable/Disable Print Data Converter

To enable/disable Print Data Converter function, select [Enable] or [Disable] in [Print Data Converter] and click [Save].

Notes

[Enable] can be selected when Converter is imported.

If [Disable] is selected, Print Data Converter function does not work even Converter is imported.

2-4-5. Export Converter

- 1) Click [Export] in [Current Converter].
- 2) Print Data Converter Export window is shown..

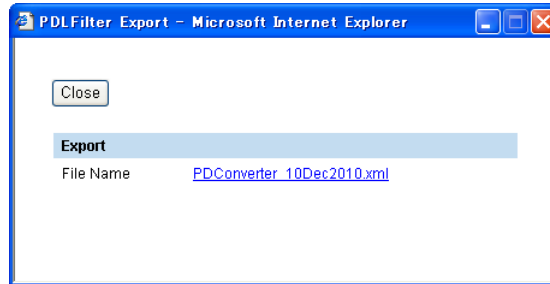


Fig.2-4

- 3) Click File Name to Export
- 4) Click Close after Exporting

2-4-6. Delete Converter

- 1) Click [Delete] in [Current Converter]
- 2) Click [OK] on confirmation window.

3. Examples

This chapter introduces few examples of the solution using Print Data Converter.

3-1. [Example] Force Monochrome print and allow Color for specified users

Situation:

Customer would like to force Monochrome print over a period of time, but they would like to give a permission of color printing to some people at the same time.

Solution:

To force Monochrome print, change the PJL command of color mode in print data

Actual print data from Windows is like:

```
■%-12345X@PJL COMMENT OKI Driver PCL
@PJL JOB NAME="Microsoft Word - test"
@PJL COMMENT DSSC PRINT ORIENTATION=0
@PJL COMMENT DSSC PRINT MEDIATYPE=PLAIN
@PJL COMMENT DSSC PRINT COLLATE=1
@PJL COMMENT DSSC PRINT ALTERNATION=0
@PJL COMMENT DSSC PRINT RENDERMODE=AUTO
@PJL COMMENT DSSC PRINT STAPLE=NONE
@PJL COMMENT DSSC PRINT PUNCH=NONE
```

Color setting can be changed with the following PJL.

@PJL COMMENT DSSC PRINT RENDERMODE=XXXX

Possible value of XXXX is "AUTO", "COLOR", "GRAYSCALE", "2KR", "2KG", (See Appendix C - Table C-04.)

To Force Grayscale, convert any value of above PJL to "GRAYSCALE". Sample xml file is as follows.

```
<?xml version="1.0" encoding="UTF-8"?>
<PDConverters>
  <PDConverterList>
    <PDConverter Index="0" Name="ForceMonoPrint" Enabled="true">
      <LanguageType>PJL</LanguageType>
      <SearchPatterns>
        <SearchPattern>@PJL COMMENT DSSC PRINT RENDERMODE=*</SearchPattern>
      </SearchPatterns>
      <Replacement>@PJL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE</Replacement>
      <OperationType>Replace</OperationType>
      <AssociatedQueues>
        <Queue>MonoPrintQue</Queue>
      </AssociatedQueues>
    </PDConverter>
  </PDConverterList>
</PDConverters>
```

Result:

Print Data sent to 'MonoPrintQueue' queue will be printed in Grayscale mode.

Print Data sent to other queue will be printed without conversion so Color print is available.

Administrator can enable/disable this solution via TopAccess. (See 2-4-4.)

Limitation:

Print data of MacPPD and XPS cannot be controlled. For PCL5c, need to add PJL to change to Grayscale. (See Appendix B).

3-2. [Example] Change any Paper Source command to AUTO command

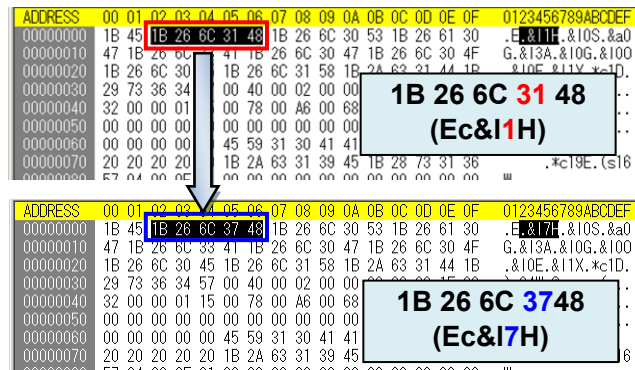
Situation:

- Customer uses special application that output PCL5 data
- The application can only output PaperSource=UpperCassette(Drawer1) and PaperSource=BypassTray command
- Customer requires to behave as PaperSource=AUTO

Solution:

PCL5 PaperSource command is Ec&I#H (See Appendix D - Table D-02.)

To solve customer's issue, replace Ec&I1H (UpperCassette command) and Ec&I2H with Ec&I7H (AUTO)



Sample xml file is as follows.

```

<?xml version="1.0" encoding="UTF-8"?>
<PDConverters>
  <PDConverterList>
    <PDConverter Index="0" Name="PaperSourceAUTO" Enabled="true">
      <LanguageType>PCL</LanguageType>
      <SearchPatterns>
        <SearchPattern>\x1B\x26I1H</SearchPattern>
        <SearchPattern>\x1B\x26I2H</SearchPattern>
      </SearchPatterns>
      <Replacement>\x1B\x26I7H</Replacement>
      <OperationType>Replace</OperationType>
      <AssociatedQueues>
        <Queue>AutoQueue</Queue>
      </AssociatedQueues>
    </PDConverter>
  </PDConverterList>
</PDConverters>

```

Result:

Print Data sent to 'AutoQueue' queue will be printed with Auto Paper Source selection.

Tips:

ESC code (0x1B) should be described as \x1B and '&' should be described as \x26. (See Notes of 2-2-2.)

Using WildCard for SerchPattern also works as follows.

```
<SearchPattern>\x1B\x26I#H</SearchPattern>
```

3-3. [Example] Allow printing from AS400/Unix/Linux on NO LIMIT BLACK function

Situation;

Even NO LIMIT BLACK function enabled, print jobs from AS400/Unix/Linux will be treated as invalid job. (Print jobs from Windows are OK.) Customer requires to allow printing from AS400/Unix/Linux also.

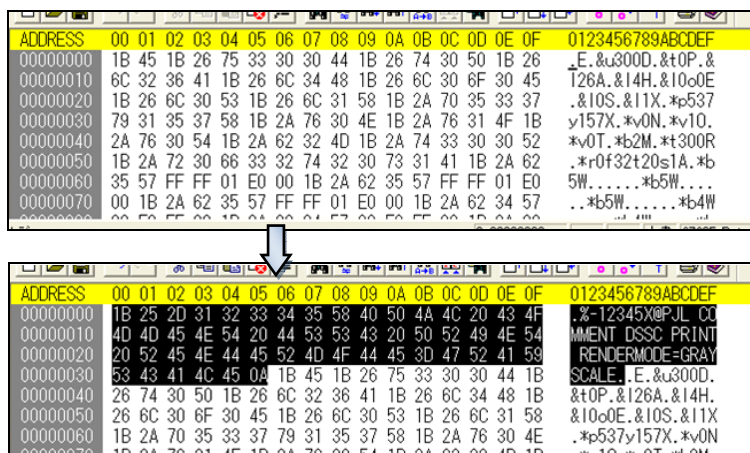
Solution:

NO LIMIT BLACK function is the setting to allow printing Monochrome job even if Department management function enabled. (See details in MFP Management Guide.)

The setting does not work for the print data from AS400/Unix/Linux because they do not content Color Mode PJP so that MFP could not detect if it's a Mono print or not. To solve this issue, add PJP Grayscale command.

<CASE 1>Print Job does not contain PJP command

-->Add UEL (Universal Exit Language: Ec%-12345X) and PJP at the beginning of the job



For CASE 1, Sample xml file is as follows.

```
<?xml version="1.0" encoding="UTF-8"?>
<PDConverters>
  <PDConverterList>
    <PDConverter Index="0" Name="AddPJPGrayscale" Enabled="true">
      <LanguageType>PJP</LanguageType>
      <SearchPatterns>
        <SearchPattern></SearchPattern>
      </SearchPatterns>
      <Replacement>\x1B%-12345X@PJP COMMENT DSSC PRINT RENDERMODE=GRAYSCALE\x0A</Replacement>
      <OperationType>InsertAtBeginning</OperationType>
      <AssociatedQueues>
        <Queue>BlackFreeQueue</Queue>
      </AssociatedQueues>
    </PDConverter>
  </PDConverterList>
</PDConverters>
```

Q&A

- Q.** Is it necessary to add UEL? How about just adding PJP at the beginning of the job?
- A.** It will work without UEL. However, adding UEL is preferred as a rule/protocol of a print data which includes PJP. According to PJP Technical Reference, "All PJP jobs must begin and end with a UEL command (<ESC>%-12345X)." "The UEL command at the beginning of the job must be immediately followed by the PJP command prefix (@PJP)."
- In case of combined job data, UEL is considered as a keyword of job separator. In almost cases, it works without UEL but adding UEL will reduce the risk.

Q. Is it necessary to add Line Feed (0x0A) after PjL command? How about Carriage Return (0x0D)?

A. According to PjL Technical Reference, it is mandatory to add Line Feed (0x0A) at the end of PjL command. Carriage Return (0x0D) can be optional command.

OK: @PjL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE<CR><LF>@PjL....

OK: @PjL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE<LF>@PjL....

NG: @PjL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE@PjL....

<CASE 2>Print Job contain PjL command -->Add PjL before/after certain PjL

For example, add @PjL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE<CR><LF> before “@PjL ENTER LANGUAGE

ADDRESS	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	0123456789ABCDEF
00000000	1B	25	2D	31	32	33	34	35	58	40	50	4A	4C	20	4A	4F	.-12345X@PjL JO
00000010	42	20	4E	41	4D	45	3D	22	31	22	0D	0A	40	50	4A	4C	B NAME="1"..@PjL
00000020	20	53	45	54	20	4F	55	54	42	49	4E	20	3D	20	4C	4F	SET OUTBIN = LO
00000030	57	45	52	0D	0A	40	50	4A	4C	20	43	4F	4D	4D	45	4E	WER..@PjL COMMENT
00000040	54	20	44	53	53	43	20	50	52	49	4E	54	20	53	54	41	T DSSC PRINT STA
00000050	50	4C	49	4E	47	3D	33	38	37	0D	0A	40	50	4A	4C	20	PLING=387..@PjL
00000060	45	4E	54	45	52	20	4C	41	4E	47	55	41	47	45	20	3D	ENTER LANGUAGE =
00000070	20	50	43	4C	0D	0A	1B	26	6C	31	53	1B	26	6C	32	36	PCL...&11S.&126

ADDRESS	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	0123456789ABCDEF
00000000	1B	25	2D	31	32	33	34	35	58	40	50	4A	4C	20	4A	4F	.-12345X@PjL JO
00000010	42	20	4E	41	4D	45	3D	22	31	22	0D	0A	40	50	4A	4C	B NAME="1"..@PjL
00000020	20	53	45	54	20	4F	55	54	42	49	4E	20	3D	20	4C	4F	SET OUTBIN = LO
00000030	57	45	52	0D	0A	40	50	4A	4C	20	43	4F	4D	4D	45	4E	WER..@PjL COMMENT
00000040	54	20	44	53	53	43	20	50	52	49	4E	54	20	53	54	41	T DSSC PRINT STA
00000050	50	4C	49	4E	47	3D	33	38	37	0D	0A	40	50	4A	4C	20	PLING=387..@PjL
00000060	43	4F	4D	4D	45	4E	54	20	44	53	53	43	20	50	52	49	@PjL COMMENT DSSC PRI
00000070	4E	54	20	52	45	4E	44	45	52	4D	4F	44	45	3D	47	52	NT RENDERMODE=GR
00000080	41	59	53	43	41	4C	45	0D	0A	40	50	4A	4C	20	45	4E	AYSCALE..@PjL EN
00000090	54	45	52	20	4C	41	4E	47	55	41	47	45	20	3D	20	50	TER LANGUAGE = P
000000A0	43	4C	0D	0A	1B	26	6C	31	53	1B	26	6C	32	36	41	1B	CL &11S.&126A

For CASE 2, Sample xml file is as follows.

```
<?xml version="1.0" encoding="UTF-8"?>
<PDConverters>
  <PDConverterList>
    <PDConverter Index="0" Name="AddPjLGrayscale" Enabled="true">
      <LanguageType>PjL</LanguageType>
      <SearchPatterns>
        <SearchPattern>@PjL ENTER LANGUAGE</SearchPattern>
      </SearchPatterns>
      <Replacement>@PjL COMMENT DSSC PRINT RENDERMODE=GRAYSCALE<CR><LF></Replacement>
      <OperationType>InsertBefore</OperationType>
      <AssociatedQueues>
        <Queue>BlackFreeQueue</Queue>
      </AssociatedQueues>
    </PDConverter>
  </PDConverterList>
</PDConverters>
```

Q&A

Q. How about adding PjL at the beginning of the job in this case?

A. Maybe it works but adding PjL before UEL=Universal Exit Language is not preferred because UEL is considered as a job separator.

Q. How about adding PjL after UEL (Ec%-12345X) using 'InsertAfter' for OperationType?

A. It's risky because UEL exists not only at the beginning of the job but also at the end of the job.

Reference:

Typical print job which contents PjL command is as follows.

PCL5 case:

```
<Esc>%-12345X@PjL xxxxx <CR><LF>  
@PjL xxxxx = xxxx <CR><LF>  
@PjL xxxxx = xxxx <CR><LF>  
⋮  
@PjL ENTER LANGUAGE = PCL <CR><LF>  
<ESC>E . . . . PCL print description . . . . <ESC>E  
<ESC>%-12345X
```

PostScript case:

```
<ESC>%-12345X@PjL xxxxx <CR><LF>  
@PjL xxxxx = xxxx <CR><LF>  
@PjL xxxxx = xxxx <CR><LF>  
⋮  
@PjL ENTER LANGUAGE = POSTSCRIPT <CR><LF>  
%!PS-ADOBE ... PostScript print description ...  
<ESC>%-12345X
```


Appendix A - WildCard for SearchPattern

WildCard can be used only for SearchPattern definition. Usable sign is different depend on LanguageType as below.

LanguageType=PJL : [*] or [?] can be used

LanguageType=PCL : [#] or [?] can be used

The asterisk character ("*") and pound sign ("#") substitutes for any zero or more characters while question mark ("?") substitutes for any one character. A pound sign ("#") should be used for PCL-LanguageType, since asterisk character ("*") may be part of a PCL5 command.

The following restrictions apply when performing a pattern search with or without wildcards:

1. Each search operates on data within a single line for PJL-LanguageTyped filters, and within a single command or single line, whichever comes first, for PCL-LanguageTyped filters. A PCL command begins with an [ESC] (or "\x1B") whereas a PJL command ends with [CR][LF] ("\x0D\x0A") or [LF] ("\x0A").
2. A wildcard may be included at the end or in the middle, but not at the very beginning of SearchPattern;
3. When OperationType==Replace and SearchPattern ends with a wildcard, the replacement operation will take place from the non-wildcard part of SearchPattern to the end of the command or the next line terminator, whichever comes first.
4. For PCL-LanguageTyped filters, if SearchPattern contains a wildcard, [ESC] character can be used only once at the beginning of SearchPattern.

Appendix B - Changeable parameters

Attached list shows changeable/addable parameters using Print Data Converter. Unchangeable parameters are grayed out

Table B-01: Changeable parameters by Print Data Converter

Basic functions		PCL5/PCL5c/raw (AS400/SAP/etc)	PCL6 (windows)	PS (windows)	PS (SAP/etc)	PS (Mac)
Sort/Group		PJL (sort)	PJL (sort) *1)	PJL	PDL	TSBPrivate
Copies		PDL (group)	PJL/PDL	PDL	PDL	PDL
Inbin		PDL	PDL	PDL	PDL	PDL
Outbin		PJL/PDL	PJL	PJL	PDL	TSBPrivate
Duplex		PDL	PDL	PDL	PDL	PDL
MediaType		PDL	PDL	PDL	PDL	PDL
Page Size		PDL	PDL	PDL	PDL	PDL
Orientation		PDL	PDL	N/A	N/A	N/A
Job related						
Color		PJL *2)	PJL	PJL	PJL	TSBPrivate
Alternation		PJL	PJL	PJL	PJL	TSBPrivate
Staple		PJL	PJL	PJL	PJL	TSBPrivate
Holepunch		PJL	PJL	PJL	PJL	TSBPrivate
Fold		PJL	PJL	PJL	PJL	TSBPrivate
Print Mode		PJL	PJL	PJL	PJL	TSBPrivate
User Name		PJL	PJL	PJL	PJL	TSBPrivate
Nickname		PJL	PJL	PJL	PJL	TSBPrivate
Color/ImageQuality related						
Document Type		PJL	PJL	PJL	PJL	TSBPrivate
Screen Type		PJL	PJL	PJL	PJL	TSBPrivate
Toner Save		PJL	PJL	PJL	PJL	TSBPrivate
Distinguish Thin Lines		PJL	PJL	PJL	PJL	TSBPrivate
PureBlack		N/A	PJL	PJL	PJL	TSBPrivate
PureGray		N/A	PJL	PJL	PJL	TSBPrivate
Color Balance		PJL	PJL	PJL	PJL	TSBPrivate
Sharpness		PJL	PJL	PJL	PJL	TSBPrivate
Brightness		PJL	PJL	PJL	PJL	TSBPrivate
Contrast		PJL	PJL	PJL	PJL	TSBPrivate
Saturation		PJL	PJL	PJL	PJL	TSBPrivate
Background Adjustment		PJL	PJL	PJL	PJL	TSBPrivate
PostScript Overprint		N/A	N/A	PJL	PJL	TSBPrivate
Black Overprint		N/A	N/A	PJL	PJL	TSBPrivate
Smoothing		PJL	PJL	PJL	PJL	TSBPrivate
Resolution		N/A	N/A	PJL	PJL	TSBPrivate
Other functions						
Do not Print Blank Pages		PJL	PJL	PJL	PJL	TSBPrivate
Letterhead Print Mode		TopAccess	PDL	PDL	PDL	N/A

*1) controllable only for sort job since pagecopies command (PDL) will be used for group setting

*2) PCL5c (color) job can be changed to Grayscale by adding PJL

Gray strings: Basically legacy systems do not output PJLs. They can be added to the jobs using "Insert" operations

Appendix C - list of major PJI

Table C-01: Destination (Outbin)

parameter	PJI	note
Stacker	@PJI SET OUTBIN=UPPER	*1 Enable when optional Finisher is installed *2 Enable when optional Job Separator is installed
Side Stacker (LOWER)	@PJI SET OUTBIN=LOWER	
Finisher *1	@PJI SET OUTBIN=OPTIONALOUTBIN1	
Finisher(Lower) *1	@PJI SET OUTBIN=OPTIONALOUTBIN2	
Stacker(Upper) *2	@PJI SET OUTBIN=OPTIONALOUTBIN4	
Stacker *2	@PJI SET OUTBIN=OPTIONALOUTBIN5	

Table C-02: Sort/Group

parameter	PJI	note
Sort*	@PJI COMMENT DSSC PRINT COLLATE=1	
Group	@PJI COMMENT DSSC PRINT COLLATE=0	

Table C-03: Copies

parameter	PJI	note
	@PJI SET COPIES=	@PJI SET COPIES works as job copies. Ec&I#X works as page copies.

Table C-04: Color

parameter	PJI	note
AUTO*	@PJI COMMENT DSSC PRINT RENDERMODE=AUTO	
COLOR	@PJI COMMENT DSSC PRINT RENDERMODE=COLOR	
Black & White	@PJI COMMENT DSSC PRINT RENDERMODE=GRAYSCALE	
Twin Color - Red	@PJI COMMENT DSSC PRINT RENDERMODE=2KR	
Twin Color - Green	@PJI COMMENT DSSC PRINT RENDERMODE=2KG	
Twin Color - Blue	@PJI COMMENT DSSC PRINT RENDERMODE=2KB	
Twin Color - Cyan	@PJI COMMENT DSSC PRINT RENDERMODE=2KC	
Twin Color - Magenta	@PJI COMMENT DSSC PRINT RENDERMODE=2KM	
Twin Color - Yellow	@PJI COMMENT DSSC PRINT RENDERMODE=2KY	
Twin Color - White	@PJI COMMENT DSSC PRINT RENDERMODE=2KW	

Table C-05: Rotated Sort Copies

parameter	PJI	note
Disable*	@PJI COMMENT DSSC PRINT ALTERNATION=0	
Enable	@PJI COMMENT DSSC PRINT ALTERNATION=1	

Table C-06: Staple

parameter	PJI	note
None*	@PJI COMMENT DSSC PRINT STAPLE=NONE	
Upper Left	@PJI COMMENT DSSC PRINT STAPLE=TOPELFT	
Upper Right	@PJI COMMENT DSSC PRINT STAPLE=TOPRIGHT	
Center Top	@PJI COMMENT DSSC PRINT STAPLE=DUALTOP	
Middle Left	@PJI COMMENT DSSC PRINT STAPLE=DUALLEFT	
Center Double	@PJI COMMENT DSSC PRINT STAPLE=SADDLESTITCH	

Table C-07: Hole Punch

parameter	PJI	note
None*	@PJI COMMENT DSSC PRINT PUNCH=NONE	
Middle Left	@PJI COMMENT DSSC PRINT PUNCH=LEFT	
Center Top	@PJI COMMENT DSSC PRINT PUNCH=TOP	

Table C-08: Folding

parameter	PJL	note
Off	none	To disable this feature, simply remove the PJL
On (Center)	@PJL COMMENT DSSC PRINT FOLD=CENTER	

Table C-09: Print Job Mode

parameter	PJL	note
Normal Print*	@PJL COMMENT DSSC PRINT PRINTMODE=NORMAL	
Scheduled Print	@PJL COMMENT DSSC PRINT PRINTMODE=SCHEDULE	
Private Print	@PJL COMMENT DSSC PRINT PRINTMODE=PRIVATE	
Hold Print	@PJL COMMENT DSSC PRINT PRINTMODE=HOLD	
Proof Print	@PJL COMMENT DSSC PRINT PRINTMODE=PROOF	
Store to e-Filing	@PJL COMMENT DSSC PRINT PRINTMODE=BOX	
Scheduled Print	@PJL COMMENT DSSC PRINT JOBTYPE_SCHEDULE=TRUE	Used for 'Multiple Job Type' to define multiple print mode at the same time, instead of ...PRINTMODE=XXXX.
Private Print	@PJL COMMENT DSSC PRINT JOBTYPE_PRIVATE=TRUE	
Hold Print	@PJL COMMENT DSSC PRINT JOBTYPE_HOLD=TRUE	
Proof Print	@PJL COMMENT DSSC PRINT JOBTYPE_PROOF=TRUE	
Store to e-Filing	@PJL COMMENT DSSC PRINT JOBTYPE_BOX=TRUE	

Table C-10: Job Name / User Name

parameter	PJL	note
Job Name	example: @PJL JOB NAME="Microsoft Word - test.doc"	Job Name should be enclosed in double quotation mark
User Name (login name)	@PJL COMMENT DSSC PRINT USERLOGIN=xxxxxx	128 characters maximum
User Name (Alias)	@PJL COMMENT DSSC PRINT NICKNAME=xxxxxx	User Name (Alias) can be used to display the owner of stored job on the panel UI of MFP. If this PJL does not exist, USERLOGIN will be used. 128 characters maximum.

Table C-11: Image Quality Type

parameter	PJL	note
General *	@PJL COMMENT DSSC PRINT DOCUMENTTYPE=NORMAL	
Photograph	@PJL COMMENT DSSC PRINT DOCUMENTTYPE=PHOTO	
Presentation	@PJL COMMENT DSSC PRINT DOCUMENTTYPE=PRESEN	
Line Art	@PJL COMMENT DSSC PRINT DOCUMENTTYPE=LINART	
Advanced	@PJL COMMENT DSSC PRINT DOCUMENTTYPE=ADVANCED	

Table C-12: Halftone

parameter	PJL	note
Auto *	@PJL COMMENT DSSC PRINT SCREENTYPE=AUTO	
Smooth	@PJL COMMENT DSSC PRINT SCREENTYPE=SMOOTH	
Detail	@PJL COMMENT DSSC PRINT SCREENTYPE=DETAIL	

Table C-13: Distinguish Thin Lines

parameter	PJL	note
Disable *	@PJL COMMENT DSSC PRINT THINLINELIMIT=0	
Enable	@PJL COMMENT DSSC PRINT THINLINELIMIT=1	

Table C-14: Pure Black

parameter	PJL	note
OFF	@PJL COMMENT DSSC PRINT PUREBLACKEX=8	
ON - Auto *	@PJL COMMENT DSSC PRINT PUREBLACKEX=0	
ON - Text	@PJL COMMENT DSSC PRINT PUREBLACKEX=9	
ON - Text & Graphic	@PJL COMMENT DSSC PRINT PUREBLACKEX=11	
ON - Text, Graphic & Image	@PJL COMMENT DSSC PRINT PUREBLACKEX=15	

Table C-15: Pure Gray

parameter	PJL	note
OFF	@PJL COMMENT DSSC PRINT PUREGRAYEX=8	
ON - Auto *	@PJL COMMENT DSSC PRINT PUREGRAYEX=0	
ON - Text	@PJL COMMENT DSSC PRINT PUREGRAYEX=9	
ON - Text & Graphic	@PJL COMMENT DSSC PRINT PUREGRAYEX=11	
ON - Text, Graphic & Image	@PJL COMMENT DSSC PRINT PUREGRAYEX=15	

Table C-16: Black Overprint

parameter	PJL	note
OFF	@PJL COMMENT DSSC PRINT BLACKOVERPRINT=0	
ON (Apply to Text & Graphic)	@PJL COMMENT DSSC PRINT BLACKOVERPRINT=1	
ON (Apply to Text)	@PJL COMMENT DSSC PRINT BLACKOVERPRINT=2	

Table C-17: PostScript Overprint

parameter	PJL	note
OFF	@PJL COMMENT DSSC PRINT OVERPRINT=0	
ON	@PJL COMMENT DSSC PRINT OVERPRINT=1	

Table C-18: Color Balance

parameter	PJL	note
	<p>@PJL COMMENT DSSC PRINT CB C=000000 @PJL COMMENT DSSC PRINT CB M=000000 @PJL COMMENT DSSC PRINT CB Y=000000 @PJL COMMENT DSSC PRINT CB K=000000</p>	<p>Color Balance adjustment can be defined for Low/Middle/High density of C/M/Y/K. (value is defined as LLMMHH. min:-4/max:+4)</p> <p>EX.) To define Low=-4, Middle=0 and High=+4, PJL should be defined as below. @PJL COMMENT DSSC PRINT CB C=FC0004</p> <p>-4:"FC" / -3:"FD" / -2:"FE" / -1:"FF" / 0:"00" / +1:"01" / +2:"02" / +3:"03" / +4:"04"</p>

Table C-19: Contrast

parameter	PJL	note
	@PJL COMMENT DSSC PRINT CONTRAST=XX	<p>XX: the value should be defined as below. -4:"FC" / -3:"FD" / -2:"FE" / -1:"FF" / 0:"00" / +1:"01" / +2:"02" / +3:"03" / +4:"04"</p>

Table C-20: Brightness

parameter	PJL	note
	@PJL COMMENT DSSC PRINT BRIGHTNESS=XX	XX: the value should be defined as below. -4:"FC" / -3:"FD" / -2:"FE" / -1:"FF" / 0:"00" / +1:"01" / +2:"02" / +3:"03" / +4:"04"

Table C-21: Background Adjustment

parameter	PJL	note
	@PJL COMMENT DSSC PRINT BACKGROUND ADJUSTMENT	XX: the value should be defined as below. -4:"FC" / -3:"FD" / -2:"FE" / -1:"FF" / 0:"00" / +1:"01" / +2:"02" / +3:"03" / +4:"04"

Table C-22: Saturation

parameter	PJL	note
	@PJL COMMENT DSSC PRINT SATURATION=XX	XX: the value should be defined as below. -4:"FC" / -3:"FD" / -2:"FE" / -1:"FF" / 0:"00" / +1:"01" / +2:"02" / +3:"03" / +4:"04"

Table C-23: Sharpness Filter

parameter	PJL	note
	@PJL COMMENT DSSC PRINT SHARPNESS=OFF	
	@PJL COMMENT DSSC PRINT SHARPNESS=XX	XX: the value should be defined as below. -4:"FC" / -3:"FD" / -2:"FE" / -1:"FF" / 0:"00" / +1:"01" / +2:"02" / +3:"03" / +4:"04"

Table C-24: Resolution

parameter	PJL	note
600dpi	@PJL COMMENT DSSC PRINT XYRESOLUTION=600x600 @PJL SET RESOLUTION=600	The value of @PJL SET RESOLUTION=xxx will be applied if it's conflict with the value of XYRESOLUTION.
1200dpi	@PJL COMMENT DSSC PRINT XYRESOLUTION=1200x1200 @PJL SET RESOLUTION=1200	

Table C-25: Toner Save

parameter	PJL	note
OFF	@PJL COMMENT DSSC PRINT TONERSAVE=0	
ON	@PJL COMMENT DSSC PRINT TONERSAVE=1	

Table C-26: Do not Print Blank Pages

parameter	PJL	note
OFF	@PJL COMMENT DSSC PRINT WHITEPAPER=0	
ON	@PJL COMMENT DSSC PRINT WHITEPAPER=1	

Table C-27: Department Code

parameter	PJL	note
Old PJL	@PJL COMMENT DSSC PRINT ACCESSCODE=XXXXX	5-digit department code
New PJL (encoded)	@PJL COMMENT DSSC PRINT ACCESSCODEEEX=XXXXX	New PJL which encodes department code. Encode rule is not opened.

Appendix D - list of major PCL5 command

Table D-01: Page Size

PCL5 command	parameter	actual command	note
Ec&#A	A4 (210 x 297 mm)	Ec&I26A	
	A3 (297 x 420 mm)	Ec&I27A	
	A5 (148 x 210 mm)	Ec&I25A	
	A6 (105 x 248 mm)	Ec&I24A	
	Letter (8½ x 11")	Ec&I2A	
	Ledger (11 x 17")	Ec&I6A	
	Legal (8½ x 14")	Ec&I3A	
	Statement (5½ x 8½")	Ec&I15A	
	Computer (10 1/8 x 14")	Ec&I501A	
	13" LG (8½ x 13")	Ec&I10A	
	8.5" Square (8½ x 8½")	Ec&I502A	
	Folio (210 x 330 mm)	Ec&I9A	
	B4 (257 x 364 mm)	Ec&I46A	
	B5 (182 x 257 mm)	Ec&I45A	
	Postcard (100 x 148 mm)	Ec&I71A	
	16K (195 x 270 mm)	Ec&I505A	
	8K (270 x 390 mm)	Ec&I504A	
	A3-WIDE (304 x 457 mm)	Ec&I507A	
	LD-WIDE (304 x 457 mm)	Ec&I508A	
	320 x 450 mm	Ec&I517A	
320 x 460 mm	Ec&I518A		
13 x 19"	Ec&I519A		

Table D-02: Paper Source (inbin)

PCL5 command	parameter	actual command	note
Ec&#H	Auto	Ec&I7H	This command can be defined in each page. If no command in the page, the setting of previous page should be used.
	MPT	Ec&I2H	
	Tray1	Ec&I1H	
	Tray2	Ec&I4H	
	Tray3 / LCF	Ec&I5H	
	Tray4	Ec&I21H	
	External LCF	Ec&I20H	
	Insertor	Ec&I30H	

Table D-03: Destination (Outbin)

PCL5 command	parameter	actual command	note
Ec&#G	Stacker	Ec&I1G	If both PjL and PCL5 command exists, PCL5 command will be used. *1 Enable when optional Finisher is installed. *2 Enable when optional Job Separator is installed.
	Side Stacker(LOWER)	Ec&I2G	
	Finisher *1	Ec&I3G	
	Finisher(Lower) *2	Ec&I4G	
	Stacker(Upper) *2	Ec&I6G	
	Stacker *2	Ec&I7G	

Table D-04: Paper Type (Media Type)

PCL5 command	parameter	actual command	note
Ec&n#Wd[String]	Plain	Ec&n6WdPlain	# = number of data bytes of the operation [d] + [String] This command can be defined in each page.
	Recycled	Ec&n9WdRecycled	
	Thick 1	Ec&n8WdThick 1	
	Thick 2	Ec&n8WdThick 2	
	Thick 3	Ec&n8WdThick 3	
	Thick 4	Ec&n8WdThick 4	
	Special 1	Ec&n11WdWaterproof 1	
	Special 2	Ec&n11WdWaterproof 2	
	Transparency	Ec&n13WdTransparency	
	Thin	Ec&n5WdThin	
	Plain1	Ec&n7WdPlain1	
	Plain2	Ec&n7WdPlain2	
	Thick 1 (Back)	Ec&n9WdThick 1b	
	Thick 2 (Back)	Ec&n9WdThick 2b	
	Thick 3 (Back)	Ec&n9WdThick 3b	
	Thick 4 (Back)	Ec&n9WdThick 4b	
	Special 1 (Back)	Ec&n12WdWaterproof 1b	
	Special 2 (Back)	Ec&n12WdWaterproof 2b	
	Tab	Ec&n4WdTab	
	Envelope	Ec&n9WdEnvelope	

Table D-05: Copies

PCL5 command	parameter	actual command	note
Ec&l#X	# = Number of copies	example: 2copies Ec&l2X	Ec&l#X can be defined in each page. If no command in the page, the setting of previous page is used.

Table D-06: Simplex/Duplex

PCL5 command	parameter	actual command	note
Ec&l#S	Simplex	Ec&l0S	
	Duplex, Long-Edge Binding	Ec&l1S	
	Duplex, Short-Edge Binding	Ec&l2S	

Table D-07: Orientation

PCL5 command	parameter	actual command	note
Ec&l#O	Portrait	Ec&l0O	
	Landscape	Ec&l1O	
	Reverse Portrait	Ec&l2O	
	Reverse Landscape	Ec&l3O	

Q&A

Q. How to remove string/command?

A. Define blank as "Replacement" and select "Replacement" as OperationType

Q. When xml file contents multiple settings, is it possible to disable specified setting?

A. Yes. You can enable/disable each setting by changing the value of 'Enabled' entry (true/false - See detail in 2-2-3.)

Q. Is it possible to apply multiple converter settings to the same job?

A. Yes. Multiple settings can be applied to the same print queue. In that case,

Q. Is it possible to apply Print Data Converter to the job via Raw protocol?

A. Yes. Defining 'Print' (default queue name for MFP) to 'Queue' element will apply Print Data Converter to the print data via RAW protocol. However, please NOTE that it is risky because every incoming print data will be conversion target. Other values except 'Print' for 'Queue' will not apply Print Data Converter for Raw protocol.