# Corporate Symbol_4C

DNP DS & RX1 Mac Printer Driver

**Functional Specifications**

Version 1.0

December 6, 2012

Presented by:

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## Electronic Files Location

*Master File Location:*[*\\FILESERVER.DNPPHOTO.LOCAL\CORPORATESHARE\PRODUCT MANAGEMENT\PUBLIC\projects\Current Projects  
\PrintTurbine*](file:///\\FILESERVER.DNPPHOTO.LOCAL\CORPORATESHARE\PRODUCT%20MANAGEMENT\PUBLIC\projects\Current%20Projects\PrintTurbine)

Print Size Matrix (all printers)

[*\\FILESERVER.DNPPHOTO.LOCAL\CORPORATESHARE\PRODUCT MANAGEMENT\PUBLIC\projects\Current Projects\PrintTurbine\5.3\PrintTurbine\_5.3\_PrintSizes.xls*](file:///\\FILESERVER.DNPPHOTO.LOCAL\CORPORATESHARE\PRODUCT%20MANAGEMENT\PUBLIC\projects\Current%20Projects\PrintTurbine\5.3\PrintTurbine_5.3_PrintSizes.xls)

# Front Matter

## Creation/Edit History

|  |  |  |
| --- | --- | --- |
| **Date** | **Created/Changed by** | **Notes/Reference** |
| 6 Dec 12 | Timothy Katje | Created document |
| 8 Jan 12 | Timothy Katje | Removed 6x9 references in RX1 sections, removed 2x6 size references in tables (not a size, just a extra-cut feature), fixed ToC. |

## Project Team Members

|  |  |
| --- | --- |
| Timothy Katje, *Sales Engineer* | Norikazu Saito, *Product Manager* |

## Project Request Origination

The original third-party software developer contracted to produce DNP’s Mac compatible printer drivers is no longer able to meet their contract obligations. Due to the exorbitant cost of acquiring the code base for the current drivers, DNP will contract with a new third-party developer to create a combined DS40/DS80/RX1 driver for Mac OS based systems.

# Objective

The purpose of this document is to outline the required features of a new combined DS40/80/RX1 Mac OS printer driver

# Background

CUPS (formerly an acronym for Common UNIX Printing System) is a modular printing system for Unix-like computer operating systems which allows a computer to act as a print server. A computer running CUPS is a host that can accept print jobs from client computers, process them, and send them to the appropriate printer.

CUPS consists of a print spooler and scheduler, a filter system that converts the print data to a format that the printer will understand, and a backend system that sends this data to the print device. CUPS uses the Internet Printing Protocol (IPP) as the basis for managing print jobs and queues. It also provides the traditional command line interfaces for the System V and Berkeley print systems, and provides support for the Berkeley print system's Line Printer Daemon protocol and limited support for the server message block (SMB) protocol. System administrators can configure the device drivers which CUPS supplies by editing text files in Adobe's PostScript Printer Description (PPD) format. There are a number of user interfaces for different platforms that can configure CUPS, and it has a built-in web-based interface. CUPS is free software, provided under the GNU General Public License and GNU Lesser General Public License, Version 2. (<http://en.wikipedia.org/wiki/CUPS>)

# Software Delivery

## Installer

Third-party developer will provide a installer package to install the combined DS40/80/RX1 driver files on supported Mac OS systems. The installer should support Mac OS versions 10.6.0 (Snow Leopard) through 10.8.x (Mountain Lion), both 32-bit and 64-bit flavors.

# DNP DS40/80 Printer(s)

## Overview

The compact DNP DS40 and DS80 Digital Photo Printers combine high-speed printing with dye-sub technology to produce high-quality photos up to 6 x 9 and 8 x 12”, respectively.

## Hardware Specifications

### Product Specifications/System Configuration

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Model Print type Print mode |  | DS40 | |  | DS80 | |
| Thermal dye sublimation transfer | | | | |
| High-speed mode | High quality mode |  | High-speed mode | High quality mode |
| Resolution |  | 300 x 300dpi | 300 x 600dpi |  | 300 x 300dpi | 300 x 600dpi |
| Print size | L (3.5x5") | 89 x 127 mm | | 8x4" | 203 x 102 mm | |
| PC (4x6") | 101 x 152 mm | | 8x5" | 203 x 127 mm | |
| 2L (5x7") | 127 x 178 mm | | 8x6" | 203 x 152 mm | |
| A5 (6x8") | 152 x 203 mm | | 8x8" | 203 x 203 mm | |
| A5W (6x9") | 152 x 229 mm | | 8x10" | 203 x 254 mm | |
|  |  | |  |  | |
| Print sheet | L (3.5x5") | 400 sheets | | 8x10" | 130 sheets | |
| PC (4x6") | 400 sheets | | 8x12" | 110 sheets | |
| 2L (5x7") | 230 sheets | |  |  | |
| A5 (6x8") | 200 sheets | |  |  | |
| A5W (6x9") | 180 sheets | |  |  | |
|  |  | |  |  | |
| Print time | L (3.5x5") | Approx. 8.4 sec | Approx. 10.8 sec | 8x10" | Approx. 30.2 sec | Approx. 40.2 sec |
| PC (4x6") | Approx. 8.9 sec | Approx. 11.7 sec | 8x12" | Approx. 35.2 sec | Approx. 46.2 sec |
| 2L (5x7") | Approx. 12.8 sec | Approx. 17.4 sec |  |  | |
| A5 (6x8") | Approx. 13.9 sec | Approx. 19.3 s |  |  | |
| A5W (6x9") | Approx. 16.4 sec | Approx. 22.4 sec |  |  | |
|  |  |  |  |  | |
| Ribbon type |  | YMC + overcoat | | | | |
| Interface |  | USB 2.0 | | | | |
| Dimensions |  | 322mm W x 366mm D x 170mm H | | | | |
| Weight |  | Approx. 14 kg (printer only) | | | | |
| Power |  | AC 100v - 240v 50/60 Hz | | | | |
| Power consumption |  | 100V 3.96A / 240V 1.69A | | | | |
| Noise |  | A-weighted sound pressure level < 70dB: "less than 70dB | | | | |
| Operating environment |  | Temp. 5～35℃ in natural conditions | | | | |
| Humidity 35～80% with no condensation | | | | |

### Required Software, Hardware, and Consumables

**Hardware Interface**

* Universal Serial Bus (USB) v 2.0 or higher

**Supported Media**

* **DNP DS40 and RX1**
  + 5” wide paper roll
    - L (3.5 x 5”) dyesub ribbon
    - 2L (5 x 7”) dyesub ribbon
  + 6” wide paper roll
    - PC (4 x 6”) dyesub ribbon
    - A5 (6 x 8”) dyesub ribbon
    - A5W (6 x 9”) dyesub ribbon\*

\* Size not supported on RX1

* **DNP DS80**
  + 8” wide paper roll
    - 8 x 10” dyesub ribbon
    - 8 x 12” dyesub ribbon

### Supported Sizes

The DS and RX series printers are capable of printing all of the sizes listed in the table below as long as they are loaded with supported media. If a printer is loaded with the wrong media and an unsupported print size is submitted, the printer will enter error state 01500. The driver must support all of the sizes listed. If Mac OS permits it, it would be preferable to only display the supported print sizes based on what media type is loaded into the printer(s).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Print Size** | **Supported media** | **DS40** | **DS80** | **RX1** |
| (5x3.5) | 5x3.5/5x7/6x4/6x8/6x9/8x10/8x12 | X | X | X |
| (5x7) | 5x7/6x8/6x9/8x10/8x12 | X | X | X |
| (6x4) | 5x7/6x4/6x8/6x9/8x10/8x12 | X | X | X |
| (6x4) x2 | 6x8/6x9/8x10/8x12 | X | X | X |
| (6x8) | 6x8/6x9/8x10/8x12 | X | X | X |
| (6x9) | 6x9/8x10/8x12 | X | X |  |
| (8x10) | 8x10/8x12 |  | X |  |
| (8x12) | 8x12 |  | X |  |
| (8x4) | 8x10/8x12 |  | X |  |
| (8x4) x2 | 8x10/8x12 |  | X |  |
| (8x4) x3 | 8x12 |  | X |  |
| (8x5) | 8x10/8x12 |  | X |  |
| (8x5) x2 | 8x10/8x12 |  | X |  |
| (8x5)\_(8x4) | 8x10/8x12 |  | X |  |
| (8x6) | 8x10/8x12 |  | X |  |
| (8x6) x2 | 8x12 |  | X |  |
| (8x6)\_(8x4) | 8x10/8x12 |  | X |  |
| (8x6)\_(8x5) | 8x12 |  | X |  |
| (8x8) | 8x10/8x12 |  | X |  |
| (8x8)\_(8x4) | 8x12 |  | X |  |
| A4\_length | 8x12 |  | X |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

### Cut Sizes

The printer specification guides specify where each cut must be made for regular and multi-print prints. These specifications must be followed exactly to ensure that there is no over-bleed of prints on one another.

### Error Handling

The user should be notified of basic hardware issues as supported by Mac OS and the CUPS kernels and the error condition should be logged in the printing system’s log file. Priority error states are media out, paper out, paper jam, cover open. These status errors must be included in the first version of the driver.

### Error Value Chart

|  |  |  |  |
| --- | --- | --- | --- |
| **Code** | **Status** | **Code** | **Status** |
| 00000 | Idling | 02000 | Head voltage error |
| 00001 | Printing | 02100 | Head position error |
| 00500 | Head cooling down | 02200 | Power supply fan stopped |
| 00510 | Cooling the paper winding motor | 02300 | Cutter error (Cut jamming etc.) |
| 01000 | Cover is open | 02400 | Pinch roller position error |
| 01010 | No scrap box | 02500 | Abnormal head temperature |
| 01100 | Paper End | 02600 | Abnormal media temperature |
| 01200 | Ribbon End | 02610 | Abnormal temperature of paper winding motor |
| 01300 | Paper jam | 02700 | Ribbon tension error |
| 01400 | Ribbon errors (detect error, ribbon break) | 02800 | RF-ID module error |
| 01500 | Paper Definition Error (The setting is different from printer setting) | 03000 | System error |

# RX-1 Printer

## Overview

The RX-1 printer is a low-cost version of the DS-40 printer.   
In print sizes, media and failover behavior it behaves consistent with the DS40.

## Hardware Specifications

### Product Specifications/System Configuration

|  |  |
| --- | --- |
| **Item** | **Target Specifications** |
| Print Quality | Photo quality print |
| Resolution | 300x300 dpi |
| Print Size | 3.5x5, 4x6, 5x7, 6x8 |
| Print Number | L/A5 : 400 sheets  PC: 400 sheets  2L: 230 sheets  A5: 180 sheets |
| Print Speed | L : 8.4 s/sheet  PC: 8.9 s/sheet  2L: 12.8 s/sheet  A5: 13.9 s/sheet |
| Media | paper/ribbon: L, PC, 2L, A5 |
| Finish Types | glossy, matte (YMC+ Overcoat) |
| Power | 100 ~ 240 V automatic transformation |
| Interface | USB2.0 |
| Buffer Memory | 128Mb |

**Hardware Interface**

* Universal Serial Bus (USB) v 2.0

**Supported Media**

* See DS40 supported media sizes

### Error Handling

Error handling for the DS-RX1 is consistent with the DS40 printer.

See Error Value Chart for list of error messages.

# Current Driver Design and Capabilities

The new driver should match the existing driver GUI as closely as possible as to limit any customer confusion. Since Mac OS controls the overall look and feel of the printer dialogs, this should not be too difficult to accomplish. All screenshots were taken on Mac OS 10.8 and, when required, from the Preview.app, which should be representative of the majority of apps on Mac OS systems.

## Preview.app Print Dialogs

By default, the printer dialog box appears in a condensed form which hides all of the important printer settings for the DNP printers. If possible, override this default and make “Show Details” the default dialog.

|  |  |
| --- | --- |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Printer – **Rename** printer(s):    1. DNP DS40    2. DNP DS80    3. DNP RX1 2. Presets – **Add** a custom default for the most commonly used setting for each selected printer:    1. DS40 = 6x4, fill entire paper, glossy, 300x300dpi    2. DS80 = 8x10, fill entire paper, glossy, 300x300dpi    3. RX1 = 6x4, fill entire paper, glossy, 300x300dpi 3. Paper Size – **Set** default size based on loaded media    1. 6x4 = 6x4, 5x7 = 5x7, 8x10 = 8x10, etc    2. Mac OS may not permit this 4. Orientation – **Set** Landscape as the default orientation 5. Preview (or other App name)    1. Auto rotate – **Checked** by default    2. Scale – Scale to Fit: - Fill Entire Paper **set** by default    3. Copies per page       1. Support 1, 2, 4, 6, 9, and 16 |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Layout    1. Border       1. **Add** a .25” white border |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Paper Handling - **No changes needed** |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Cover Page – **No changes needed** |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. DNP Printer Settings – General    1. Overcoat – **Rename** to “Finish”       1. Glossy (default)       2. Matte    2. **Add** “2inch cut” pull-down menu       1. **Option only appears when DS40 or RX1 selected**       2. Disabled (default)       3. Enabled       4. If printer FW or HW doesn’t support, feature is either grayed out, or if enabled, ignored by the printer.    3. Resolution       1. 300x300 dpi (default)       2. 300x600 dpi    4. Sharpness       1. [-10, 10], default 0    5. Gamma Correction – **Rename** to “Gamma”       1. [-10, 10], default 0    6. Contrast       1. [-10, 10], default 0    7. Brightness       1. [-10, 10], default 0 |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. DNP Printer Settings – Color    1. Saturation       1. [-10, 10], default 0    2. Color Correction       1. Red          1. [-10, 10], default 0       2. Green          1. [-10, 10], default 0       3. Blue          1. [-10, 10], default 0 |
| **C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpegNOT IN CURRENT DRIVER GUI!** | 1. **Add / Enable** the Color Matching menu    1. DNP requires the ability to disable ColorSync color correction or change enabled color profile.    2. Printers technically have no “In Printer” color correction, so if possible, rename “In Printer” to “Disabled”.    3. Profile should default to Automatic, but be able to choose any color profile. Recently used profiles are listed for reselection, other’s can be selected by choosing “Other Profiles…” |
| **C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpegNOT IN CURRENT DRIVER GUI!** | 1. Select ColorSync Profile    1. When “Other Profiles…” option chosen on previous menu, the Select ColorSync Profile dialog box should appear on top of screen.    2. User may choose any of the ColorSync profiles listed by highlighting it and pressing OK. |

## System Preference – Print & Scan Dialogs

The look and feel is handled by the Mac OS kernel. Screenshots were taken on a MacOS 10.8 system. Make changes as specified in the table below.

|  |  |
| --- | --- |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Printers – **Rename** printer(s):    1. Current printer names are too long to fit on screen, rename as follows:       1. DNP DS40       2. DNP DS80       3. DNP RX1    2. Subsequent instances of the same model printer require appending a -# at the end of the printer name, starting at 2       1. i.e. DNP DS40-2, DNP DS40-3 2. **Include** a picture representing the physical printer    1. 1x for DS40 and DS80    2. 1x for RX1 3. Printer name reflects the name of the printer selected under Printers 4. Open Print Queue button will open the selected printer’s print queue. (Detailed in next section) 5. Options & Supplies opens a new dialog box to look at printer statuses 6. Location is the name of the Mac the printer is physically connected to 7. Kind represents the name of the printer driver    1. See names listed under 1a. 8. Status reports the current status code the printer is reporting    1. Current driver lists last status when printer was connected. Would prefer a status of “Not connected” if the printer isn’t turned on or is physically disconnected from the Mac. 9. Share this printer permits sharing the printer with other users on the network. 10. Sharing Preferences takes user to the Sharing system preferences dialog. 11. Default printer permits the user to select which printer is the default printer. If only one printer installed, it should be the DNP printer that is attached. 12. Default paper size     1. **Add** the following sizes as options in the paper size list:        1. DS40:           1. 5x3.5, 5x7, 6x4, 6x8, 6x9        2. RX1:           1. 5x3.5, 5x7, 6x4, 6x8        3. DS80           1. 8x10, 8x12 |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Options and Supplies    1. General       1. Name permits the user to change the name of the printer instance, should default to names listed previously.       2. Location permits user to change the location description of the printer. Defaults to the name of the Mac the printer is connected to.       3. Device Name is the true printer instance name as it’s known within CUPS.       4. Driver version reports current printer driver version.          1. **Start versioning** at 5.0 for this new driver and version accordingly based on complexity of changes. |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | * 1. Supply Levels – No media      1. If printer turned off or unable to obtain supply status’, respond with “Information Not Available” |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | * 1. Supply Levels – Checking      1. While the driver is in the process of obtaining the information, display the “Gathering Information…” dialog and have the pinwheel animated. |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | * 1. Supply Levels – Normal      1. **Add** a line that reports what media type is loaded in the printer         1. I.e. 6x4, 8x12, 6x8, etc.      2. Ribbon remaining should continue to display a numeric count of XX of XXX alongside a percentage bar displaying visually how much ribbon remains      3. There should be a 10% remaining indicator line which varies per media loaded, and a warning indicator icon that appears when the ribbon remaining drops below this threshold.      4. Also display to the user “Supply levels shown are approximate.” |

## Print Queue Dialogs

The look and feel is handled by the Mac OS kernel. Screenshots were taken on a MacOS 10.8 system. Make changes as specified in the table below.

|  |  |
| --- | --- |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Print Queue Main Dialog – No changes |
| C:\Users\tkatje\Dropbox\DNP Photo\Screenshots\Mac OS 10.8\Preview Print\DS40\01-04 - DS40 - Preview Print Menu.jpeg | 1. Printer 🡪 About Printer Menu    1. Displays a pop-up dialog box with the printer driver details. |