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# 1 About StudioRIP

## 1.1 OVERVIEW

**StudioRIP** is a PostScript 3, PDF 1.7 (ISO 32000-1:2008), TIFF, JPEG and BMP compatible software RIP, designed for high speed and high quality devices like platesetters or imagesetters, ink-jet devices used for repro (CTP, CTF) or proofing purposes, laser printers or any other raster printing devices. Unlike other RIP's, all StudioRIP's features are written into the core software, eliminating the potential conflicts which exist in many plug-in workflow solutions.

The PostScript/PDF engine used by StudioRIP is RasterCore, a high performance software optimized for Intel SSSE-3 compatible platforms. While the PostScript/PDF interpretation is done by Ghostscript from Artifex Software Inc., RasterCore uses its own code for screening, rendering, trapping, overprint handling, object list management, transparency flattening, multithreading etc.

## 1.2 THE AIM OF STUDIO RIP

StudioRIP is a high quality, comfortable and powerful pre-press workflow integrated into one interface. The designers of StudioRIP had the special intention to:

- **Create an intuitive, easy to use, very visual interface**, similar to the DTP applications that the designers are familiar with, allowing jobs to be previewed at all levels of processing (separations, composite, imposition, media).
- **Integrate all workflow tasks into the same interface**. All different tasks (job processing and management, trapping, previewing, imposition, proofing, imaging, history) are integrated into one interface, where each can be interacted with and managed from.
- **Keep the architecture flexible**. StudioRIP can be used in small pre-press studios as single-computer and single-engine installations, as well as in large publishing houses as multi-computer and multi-engine installations, where various departments have to control the workflow.
- **Offer full control**. While various components of StudioRIP can be installed in various places of the building, designers and operators have full control of the whole workflow process from their workstations.
- **Provide accurate color preview with continuous zoom**. While some popular alternatives to StudioRIP still offer two levels of magnification (microscopic and full page) and output colored with over-bright inks without color management, StudioRIP's preview has ICC color management, moiré filtered continuous zoom and four levels (separations, composite, imposition, media).
- **Match or surpass the speed and quality** of the state-of-the-art in the RIP market, offering several screening types that can be fine tuned for the special needs of each customer.

### 1.3 FEATURES OF STUDIO RIP

- **Compatibility:** StudioRIP is designed for compatibility with Adobe's cutting edge imaging technologies: PostScript 3 and PDF 1.7.
- **Media saving:** Saves potentially wasted material by automatically rotating and collecting the pages to minimize the media usage.
- **Remote operation:** Control of the rip on the desktop of every designer or operator, from Mac or PC workstations. As the server application has no visual interface (it is an icon in the system tray), the client application has full control over the RIP through any network connection.
- **Built-in imposition:** User definable styles, manual and automatic page arrangement, user definable pre-press marks, bleed.
- **Built-in proofing:** Dot for dot, contone and halftone proofing systems, simulating line screens up to 200 lpi (dot for dot and halftone) or offering perfectly smooth output (contone) with good color accuracy (typical average  $\Delta E = 0.7$  for contone and halftone).
- **Ink duct control:** Prints a diagram or exports a PPF, JDF, BMP or JPEG file to control the ink ducts of the printing press.
- **Trapping:** Based on a raster based proprietary technology, StudioRIP trapping offers high quality shapes (excellent behavior in junctions, in the proximity of a third color, and with slightly different colors), speed and stability (due to the fast raster based algorithm), and features like auto-choke of blacks, spot color traps, special ink handling, narrowed/proportional traps, mitered traps, feathered and anamorphic traps etc.
- **Enhanced preview:** Any job can be previewed at different levels (separations, composite, imposition, media), using ICC-based color management (press and monitor ICC profiles supported) and continuous zoom.
- **High speed:** StudioRIP is one of the fastest rips available, several times faster than the majority of rips on the market.
- **Simultaneous operation:** Several designers or operators can work simultaneously with StudioRIP, by connecting as many client applications as necessary to the server.
- **Flexible output:** StudioRIP is designed to work with imagesetters, CTPs and inkjet printers. It can use the StudioRIP EtherSetter interface or interface boards with imagesetters, and the TIFF output can be used in conjunction with many CTP systems. It is also compatible with most of the popular i32-type output plugins.
- **Multiple outputs:** StudioRIP can drive multiple output devices simultaneously.
- **Flexo friendly:** Flexo distortion and flexo screens (including several flexo specific hybrid screening types) built in. Flexo printers can work with StudioRIP simply and easily, without the need for extra programs.
- **Consistent rosettes:** Our unique screening technique achieves consistent rosettes with a pleasant look even in very adverse conditions (large page, low resolution, high line screen, flexography angles).
- **Extra gray levels:** Smooth gradients are guaranteed even on engines with serious technolo-



gy limitations by using more than 4000 gray levels on almost any resolution/frequency combinations.

- **Excellent color stability:** Highlights and shadows are protected by our hybrid screening method: instead of using dot sizes below a certain (user definable) limit, the dots are stochastically removed.
- **Low-pass filtering:** Using more than 4000 shades of grays is not enough for perfectly smooth gradients, because high dot gain causes linearity problems even after calibration. Using a stochastic technique, StudioRIP can filter out the linearity problems, offering pleasant, smooth gradients even on old capstan imagesetters.
- **Protecting skin tones:** Using a yellow screen of 30°, magenta and yellow screens will not produce moiré at all.
- **Stochastic screening:** A high quality second order stochastic screening technique offers smooth tints with no graininess on individual films, and moiré free results on color jobs.
- **User-friendly interface:** StudioRIP's interface is easy to understand and simple to use. The intuitive, attractive and simple interface give the same user experience on Mac and PC workstations (with object trees, lists, dockers and drag & drop).

## 1.4 SYSTEM REQUIREMENTS

### 1.4.1 StudioRIP Server

System requirements:

- Windows 8, Windows 7, Vista or XP (or newer), 32 or 64 bits, home, professional or server
- Processor: SSSE-3 compatible, multi-core architecture recommended
- RAM: at least 2 GB, performance may increase up to 16 GB even on 32 bit systems
- HDD: at least 100 GB free space, an SSD partition for StudioRIP is recommended
- LAN: for optional over-the-net remote client connections, gigabit recommended

### 1.4.2 StudioRIP Client

System requirements:

- PC: Windows 8, Windows 7, Vista or XP (or newer), Mac: OS X 10.7 Lion (or newer)
- Hardware: the performance critical tasks being done on the Server PC, there are no special requirements, apart from the below
- Display: Full HD resolution recommended
- LAN: gigabit recommended



# 2 Installation

## 2.1 BASIC CONCEPTS

For performing a simple installation without understanding the StudioRIP architecture or configuring the network or imagesetter, go to section [2.2.8 Installing StudioRIP \(page 23\)](#). However, before installation, a general understanding of StudioRIP architecture is recommended. This is beneficial because the real power of the StudioRIP is only fully realized when it is configured to work in a network.

The StudioRIP package consists of three separate programs (i.e. executables):

- **Server**, which does the actual processing work of the system,
- **Print manager**, which interfaces with the print engines,
- **Client**, which is the visual user interface for the system.

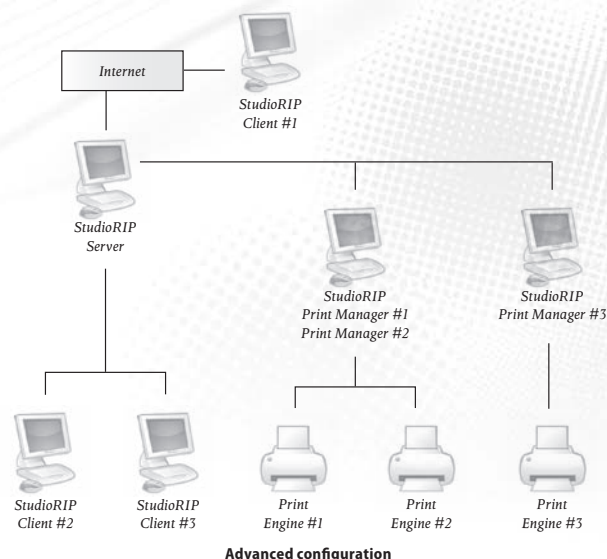
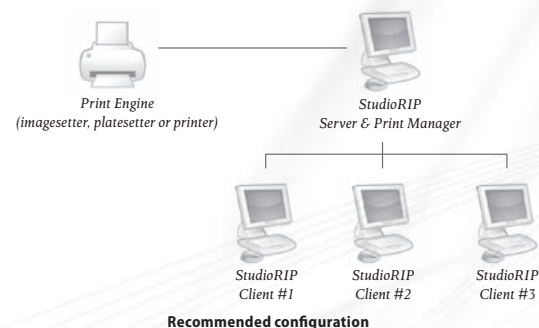
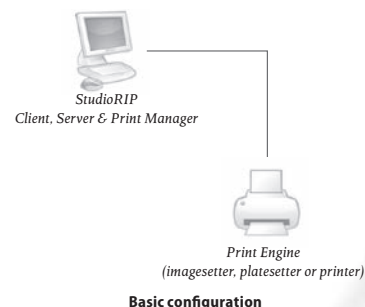
One, and only one, StudioRIP Server should be installed per site; it is the server that carries the license (dongle). More than one Print manager can be installed (one for each print engine driven by StudioRIP); and finally, multiple Clients can be installed, possibly one on each workstation, the number determined by the number of simultaneous operators desired at the site. The three programs of StudioRIP are separate units (executables), therefore each can be installed on its own separate computer, or they may be grouped in any combination desired. If the StudioRIP units are located on separate computers, the communication between them is done through the network connection linking the machines.

Some possible scenarios for installing the StudioRIP system are illustrated here:

- **Basic configuration:** the Client, Server and Print manager all run on the same computer, and the print engine is connected directly to this computer.
- **Recommended configuration:** there is a dedicated computer for the server application, but the clients are placed on different workstations and connect through the network with it. In this scenario each workstation is running a copy of the client, giving each operator full control over the RIP and the jobs they are sending to it. The Print manager is running on the same machine as the Server.
- **Advanced configuration:** more than one Print manager is installed, possibly more than one per computer (each Print manager has to be running on the computer where the interface card is installed for the print engine connected to it, unless using EtherSetter interfaces which communicate through a network interface); clients, in addition to the regular intranet network connections, can connect over the internet also.

## 2.2 PERFORMING THE INSTALLATION

Having planned the StudioRIP system, start installing the appropriate parts on the computers. The recommended installation order is:



- Configure your network so that the different parts of StudioRIP can communicate with each other (on a typical intranet LAN no modifications are necessary),
- Install the interface board (if any),
- Connect up the EtherSetter box (if any),
- Ensure that the 3<sup>rd</sup> party TIFF catcher of the engine is running and configured (if any),
- Set up the print engine for the connection with StudioRIP (including any Windows drivers and Windows printer ports),
- Install the Print manager(s) (if it will be running on different computers than the Server),
- Install the StudioRIP Server (together with the Print manager and Client, if they will run on the same computer),
- Plug in the hard key (dongle),
- Set up the print engine on the first launch of the Print manager (the installation process will automatically prompt the user to do so),
- Install the StudioRIP Clients on all workstations where needed,
- Set up the job styles on the first launch of a Client (the installation process will automatically prompt the user to do these).

### 2.2.1 Setting up the print engine

Some print engines require configuration to enable proper communication with EtherSetter, SCSI or third party interface. Refer to the user manuals of these print engines to verify or set the following:

- **Agfa (EtherSetter, PciAPIS, third party):** no settings required.
- **Ultre (third party):** no settings required.
- **Linotronic (EtherSetter, third party):**
  - LI2 set up to 8/16 MHz Clock, Sender Master, Receiver Clock, By panel and LI5;
  - LI5 set up to 9600 baud, 8 bits, no parity, CTS/RTS.
- **Scangraphic (third party):**
  - for HW772 or HW972, LI5 set up to 9600 baud, 8 bits, no parity, XON/XOFF;
  - for HW773 or HW973, set Data Input mode = FPI.
- **ECRM (SCSI, EtherSetter, third party):**
  - Mako & Knockout series: Serial mode set to Overscan Mode = OFF → Image Offset = 100 units, Overscan Mode = ON → Image Offset = 300 units;
  - VR series with firmware v2.2.1 or newer: Interface set to Serial;
  - VR series with firmware under v2.2.1 (Highwater only): Interface set to Remote, then HasSerial parameter in the appropriate file in the StudioRIP\HW folder set to 0.

#### ■ EXTRA (third party):

- for HW774 or HW974 boards set Any Stop/Start mode except Controlled Backup;
- for HW775 or HW975 boards set Stop/Start in Controlled Backup mode only.

■ **Canon BX/JX (third party):** Printer must have Canon buffer card installed;

■ **Scitex Dolev (Highwater):** see <page 11> in the Pci Plugin User Guide manual provided by HighWater in PDF format on the installation CD.

#### 2.2.2 Installing an EtherSetter box

See section 7.3 *EtherSetter interfaces* <page 115> for more detailed information on configuring EtherSetters.

- Connect the cable from the engine (imagesetter, CTP) to the EtherSetter.
- Connect the network cable to the EtherSetter (either through a network switch or directly from the LAN adapter of a PC).
- Turn on the engine and wait for it to boot.
- Connect the power cable to the EtherSetter. The power LED should light immediately and the Ready LED should start flashing.
- When the EtherSetter finished booting, after about 1 minute, the Ready LED should light.
- Now the EtherSetter will establish communication with the imagesetter and having succeeded will light the Engine link LED.
- Assuming the StudioRIP has been installed on your PC (see 2.2.8 *Installing StudioRIP* <page 23> below), start the Print Manager for the first time. A wizard will appear to allow you to choose your imagesetter from the list of available devices. Choose the driver, for example EtherAPIS (for Agfa) or EtherLino (for Linotronic).
- Once the Print manager is running, the PC link LED on the EtherSetter should light. If immediate communication is not established the first time, try rebooting the EtherSetter and restarting the Print manager. For non-standard networks it may be necessary to configure the EtherSetter manually, see 7.3 *EtherSetter interfaces* <page 115> for details.

#### 2.2.3 Legacy systems with interface boards

Fit the engine interface card into the PC that will connect to the print engine. Connect and start the print engine, then start the PC. It should say that it has 'Found new hardware'. Point it to the appropriate driver on the install CD or folder:

- for a StudioRIP PciAPIS interface card, the driver is in the *Drivers\PciAPIS* folder,
- for a Highwater Designs Ltd PCI interface card, the driver is in the *Drivers\HighWater* folder.

#### 2.2.4 Connecting to a third party TIFF catcher

In this scenario the use of the Print manager is optional. Some prefer to send the TIFF files directly from the Server to the third party TIFF catcher (the advantage being the simplicity and speed), others prefer to use the Print manager with the *TIFF output* device driver (the advantages being the History feature of the Print manager, the improved stability in case of unreliable network access, the ability to define multiple output paths, as well as the access to special TIFF settings). In either cases, follow the steps below:

- Ensure that the TIFF catcher is running and that its input hotfolder is shared, write privileges have been granted and that it is accessible to the PC running StudioRIP Server.
- In case of a networked TIFF catcher, try whether the network path of the hot folder is visible and writable from the PC running StudioRIP Server. For example, enter the network path (e.g. \\TiffCatcher\\HotFolder\\) into a Windows Explorer window, and check whether files can be copied into the hot folder.
- Write down the tested network path.

If Print manager with *TIFF output* driver will be used:

- In the *New print engine wizard* of the Print manager (see [3.1.1 Starting Print manager for the first time \(page 28\)](#)) choose your device, and select *DrvTiff.dll* from the list of available drivers;
- if your device doesn't appear in the list or doesn't list the *DrvTiff.dll* driver, choose the *Custom TIFF output* device.
- Enter the hot folder path of the third party TIFF catcher into the *Driver parameters* field;
- In the *Add print engine wizard* of the Client application (see ) connect to the Print manager (do not modify the *TIFF hot folder location* setting here!);
- In case your device wasn't listed, and you had to choose the *Custom TIFF output* device, in the next step of the wizard set up the device parameters (resolutions, sizes etc.).
- If multiple paths will be used (e.g. TIFFs of different sizes or resolutions have to go to different hot folders), you can set a different path for each job style in the *Saving TIFF* tab (see [6.1.18 Saving TIFF task \(page 88\)](#) by creating an *Output path* item with the desired path as its value.

If no Print manager will be used:

- In the *Add print engine wizard* of the Client application (see [3.1.4 Starting the Client for the first time \(page 30\)](#)) choose the *No print manager* option;
- Enter the hot folder path to the *TIFF hot folder location* field;
- In the next step of the wizard set up the device parameters (resolutions, sizes etc.).

### 2.2.5 Setting up the network

In most cases, StudioRIP installation will require no special configuration of the existing computer network. However, in special cases (interconnected networks, clients connecting from the internet into a firewalled intranet), the network administrator will find the information below useful to configure the local network for StudioRIP compatibility.

There are two communication channels that StudioRIP uses between its components:

- The Client(s) connects to the Server, by default, through TCP port 4024, therefore the computer running the Server has to expose port 4024 to incoming connections. The port number can be modified to a new setting, applied to both the Server and the Client. If this setting does not match on Server and Client, communication is not possible.
- StudioRIP Server connects to the Print manager(s) normally through TCP port 4025, but if 2 or more Print manager applications are running on the same PC, further TCP ports will be used (with port numbers assigned incrementally from 4025, i.e. 4026, 4027, etc.). Therefore any computer running a copy of Print manager has to expose port 4025 (and 4026, 4027, etc, whichever apply) to incoming connections.

It is important that these TCP channels are open between the Clients, the Server, and the Print managers. On a typical internal LAN network, all ports are freely accessible on all machines on the network, therefore no special configuration is necessary. If there are firewalls or other obstacles in the system that could obstruct access to these ports, remove them or configure them properly. Software protecting individual PCs from outside attack such as the Windows Firewall will block the ports required by StudioRIP, and they will have to be configured to allow communication through the above listed ports.

**If access to the StudioRIP system from the Internet is required, TCP port 4024 has to be opened (and forwarded, if the computer does not have a public IP address), to give the Clients access.**

### 2.2.6 Connecting from the Internet to a StudioRIP Server

If the PC running the Server has a public IP address, then opening port 4024 on the firewall protecting the network should be sufficient to allow access. If opening port 4024 proves impossible for some reason, change the TCP port used to some other commonly used port number (such as the ones used by HTTP, FTP, POP3 etc., which presumably are already open and no further network configuration will be necessary), on both the clients and on the server (on the server, modify the connection settings by right-clicking the server icon and entering the *Settings* menu).

If the StudioRIP Server has a local IP, the router has to be configured to forward TCP port 4024 on its public IP to the local IP address of the PC running the StudioRIP server.

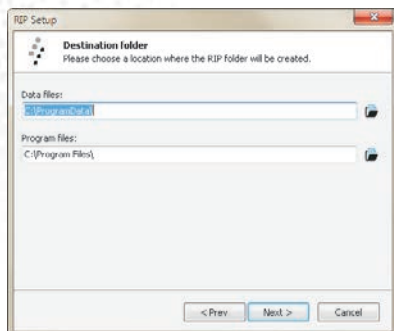
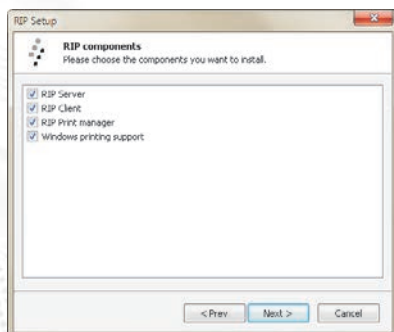
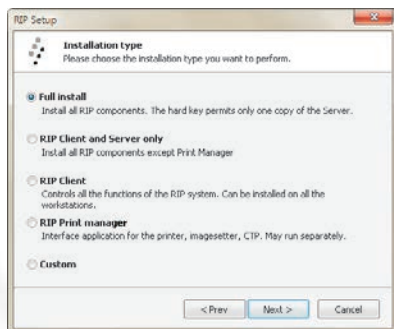
Example: the device acting as a router has the public IP of 83.103.131.214, and the StudioRIP server is running on the PC with a local IP of 192.168.0.3. To achieve a connection, TCP port



4024 on the device with the public IP 80.103.131.214 has to be mapped to the TCP port on the PC with the local IP of 192.168.0.3. This will mean that the incoming connections for the StudioRIP server will be automatically redirected to the local PC which is actually running it.

If Clients are granted access via the Internet, use StudioRIP's password control (otherwise unauthorized people could take control of StudioRIP and the print engine). See [6.6 User management](#) (page 104) about how to protect StudioRIP with password control.

**StudioRIP Server cannot be accessed through a proxy server, only via direct TCP connection.**



### 2.2.7 Installing the hard key

StudioRIP is protected by a USB hard key (dongle). The hard key protects only the Server application; it has to be installed on the computer that runs the Server. It is recommended to plug in the hard key only after the StudioRIP system has been installed.

A common problem with the hard key is that the USB ports are not installed properly in Windows (this happens quite often with USB 2.0 ports, which may require drivers from the install CD of the motherboard). If the hard key does not work correctly, carefully check that the USB port is working properly.

If the hard key is not installed, StudioRIP runs in Demo mode. In Demo mode all the functions of StudioRIP will work properly, but the a watermark will be printed all over the pages.

### 2.2.8 Installing StudioRIP

The StudioRIP setup program will have to be run on each PC that will have any StudioRIP components installed on it. Within the setup program the user can select which components to install on any given machine. The setup choices are explained below.

Insert the StudioRIP setup CD. It will automatically launch the setup program. The installation can also be started manually by running Setup.exe from the setup folder.

- Before launching the installer, a small dialog box will ask for the language to use. It is defaulted to match the language setting of the operating system.
- **Step 1:** Choose which installation type to perform. The options are self explanatory. A common mistake is to choose full install when no Print manager will be used – pay attention to choosing the right option.
- **Step 2:** if custom install has been chosen, select which parts of the program to install. Here the user can decide whether the three files types (PRN, PS and EPS) will be associated with StudioRIP.
- **Step 3:** choose the destination folder where StudioRIP will install the data folders and the executables. It is critical to choose the right location for the data folders, as StudioRIP will intensively use it – use an SSD partition if possible. It is recommended though to keep the program files at their default location.

Changing the file locations of an existing installation can be done by running the Setup and specifying the new location. The data files from the old location will be safely moved into the new location.

StudioRIP will need large areas of HDD space for storing the 1-bit files. If your PC has multiple drives or the HDD has multiple partitions, choose the biggest one for the data files.

- **Step 4:** if this installation is a re-install or an upgrade of the Server, choose whether to perform a clean install, or to keep some of the old settings.
- **Step 5:** if a previous install of the Print manager is detected, three choices will be offered. **1.** Installing a new instance (for systems with more than one print engine connected to the same computer). **2.** Perform a clean install, or, **3.** For re-installations and upgrades, keeping some of the settings of the previously installed Print manager.
- **Step 6:** after the Setup program performs the installation, there are a number of choices:
  - Set up the automatic launch of the server applications on startup; this is recommended for simple installations;
  - Register the server applications as system services; this is generally not recommended due to the lack of user control over system services (e.g. no tray icon, starting/stopping is only possible from the Services application of Windows), use it only in justified cases;
- **Step 7:** If the two 'Launch now' boxes are ticked, the Server and Print manager will start immediately. On first startup, the *Print engine setup wizard* will open; follow the instructions in section [3.1.1. Starting Print manager for the first time \(page 28\)](#).

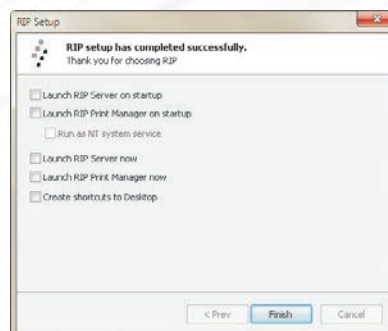
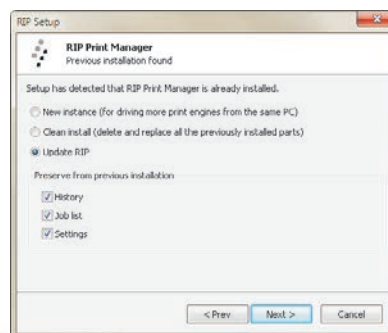
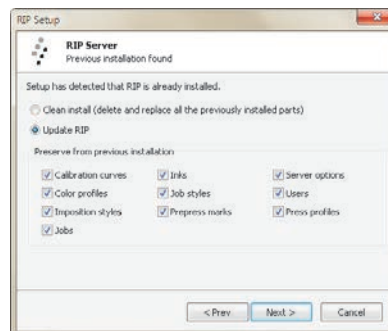
## 2.3 INSTALLING CLIENTS

### 2.3.1 Installing PC clients

Multiple copies of the Clients can be installed within the network, one on each computer that may want to control the RIP. In most cases any workstation on the network will require the Client.

Normally the StudioRIP Client is automatically installed as part of a full install (together with the Server and Print manager). However, on workstations it will have to be installed separately. Installing StudioRIP Client is extremely easy: start the StudioRIP setup program and choose the *StudioRIP Client* option under Step 1 of the installation procedure.

The StudioRIP Client application is not just a remote visualization of the server window; it is actually a completely independent program that communicates with the server. If two or more Clients are connected to the server, each can act independently, previewing different jobs, for ex-





ample. The only clue that another Client is also connected to the Server is that sometimes jobs will be started, stopped, modified etc. So a design studio with designers at 10-20 workstations can install the Client on each of the workstations. Each designer will be able to control the whole printing process, viewing their own or others' jobs from their workstations.

### **2.3.2 Installing Mac Clients**

Starting from StudioRIP XF release, Client can run natively on a Macintosh workstation running Mac OS X (the minimum requirement is 10.7 Lion). As no specific tasks are necessary on a Mac Client installation, there is no separate installer app. Instead, just simply copy the contents of the Mac folder from the CD onto the Mac, and the Client will be ready to connect to the Server.



# 3 Getting started

### 3.1 STARTING FOR THE FIRST TIME

After the installation, when the server programs (StudioRIP Server and Print manager) are launched, their normal running state is shown by a system tray icon, as these programs don't have graphical interfaces (except a few dialogs). The user interface will be provided by the StudioRIP Client application.

The two server applications can be stopped by right-clicking their icons in the system tray and clicking Exit. They can be restarted using their Start menu or desktop icons.

**If the servers are running as system services, the icons will not appear. Use the Services administrative tool to stop/start these programs. If settings changes are necessary, stop them and then restart them as regular applications.**

On startup, the Server and Print manager will open their TCP ports to listen for incoming connections (port 4024 for Server and 4025 or higher for Print manager). Some operating systems or security applications will ask whether these programs should be allowed to open these ports.

**Let StudioRIP Server and Print manager open the TCP ports! Otherwise, they will not be able to work properly. If there are options available for permanently remember this setting, check them.**

When Print manager is started for the first time, the *Print engine setup wizard* will be started. The next chapter describes how this wizard has to be completed.

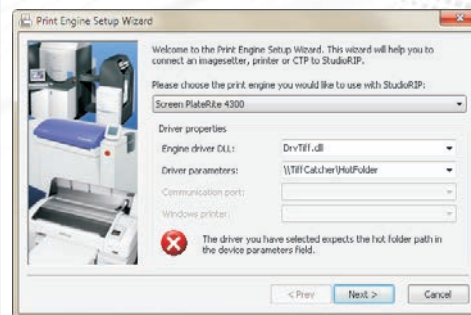
#### 3.1.1 Starting Print manager for the first time

When StudioRIP Print manager launches for the first time (and any other times it detects that no print engine is set up, or if the *Change print engine* menu item is selected), it starts the *Print engine setup wizard*. In this section, the term *print engine* refers to the physical device connected directly or indirectly to the PC and that will produce the output.

Please select the print engine from the top drop down list. By choosing the print engine to be used with StudioRIP, the *Driver properties* box will be automatically filled in with the best choice. For example, if *Agfa AccuSet 1000* is chosen, the choices will be either to drive it with the StudioRIP's EtherSetter box, PciAPIS board or HighWater's HW976 interface board. StudioRIP will detect which of these boards is present in the system, and will automatically select the correct one.

If the interface board is not yet installed, the wizard will warn about it, but will not prevent completion of the setup process.

If the print engine is connected via a TIFF catcher, and Print manager will be used to transfer the TIFF files (instead of the direct output from the Server), the Driver parameter should be set



to the network path of the default hot folder of the TIFF catcher (note that several different hot folders can be used through the *Engine setup* task of the job style).

If the print engine to be connected to StudioRIP uses a Windows communication port (typically an inkjet printer), choose the right port in the *Communication port* box. Normally this is straightforward, as the port name is similar to the engine name (e.g. *SPOOL: Epson Stylus Pro 7900*), but it might be difficult if it is driven directly through its USB port (e.g. *USB: USB2.0 Printer*).

**The easiest way to drive Epson printers is through the Windows spooler, thier ports having the 'SPOOL:' prefix. However, better performance and control can be achieved through USB or TCP ports.**

Devices installed as Windows printers (e.g. inkjet or laser printers) can also be set to use the Windows print spooler. As a last resort, this option is always available: choose the right printer with the 'SPOOL:' prefix in the *Communication port* box. This is necessary when the use of the communication port is difficult or impossible (the print engine is connected through Ethernet, Firewall port etc., or the USB port is shared for other functions).

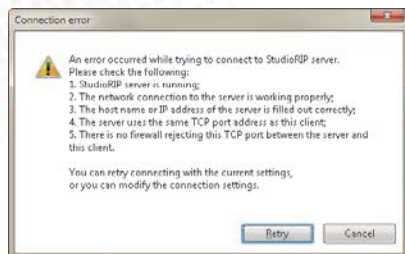
If the print engine to be connected to StudioRIP uses exclusively the Windows print spooler (i.e. it is a windows monochrome printer, such as a HP LaserJet 4000), the *Windows printer* box will become active, allowing the user to choose the printer.

**Monochrome Windows printers can be driven using the Windows monochrome printer device, and then choosing the right printer from the list.**

### 3.1.2 Connecting the Client

Once the StudioRIP Server and Print manager are running, the StudioRIP Client can be started on the local computer or on a workstation on the network:

- On the server PC, the Client can be started by its menu shortcuts (Start button → Programs menu → StudioRIP or desktop icon) or by double-clicking on the StudioRIP Server icon in the system tray. The Client should start and connect to the Server without error messages.
- On a network workstation, the Client can be started by its menu shortcuts (Start button > Programs menu > StudioRIP or desktop icon). The first time the client is run an error message will appear, because it will be unable to connect to the server on the local machine; click Cancel, which will bring up the *Connection settings* dialog box. Fill out the box (normally only the IP address of the server has to be entered), then click OK. See section [6.8.2 Connection settings](#) (page 107) for more details about the connection settings dialog box.



If StudioRIP Client fails to connect to the Server, the Server is verifiably running, and the host-

name or IP address was entered correctly, then there may be a firewall between the Client and Server. See section 2.2.5 *Setting up the network* (page 22) for further details.

**Antivirus, firewall or other protection software often causes connection problems between the Client and Server. Connection failure or blocked communication after a successful connection can both be caused by such software.**

### 3.1.3 Creating special Client shortcuts

Creating special shortcuts may be desirable in some situations, such as:

- connecting to several StudioRIP Servers from the same PC;
- logging in as different StudioRIP users to the same Server;
- running the Client in various languages.

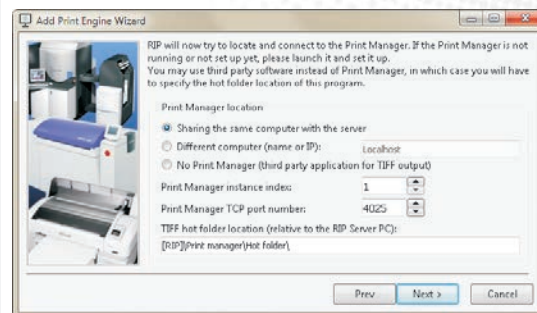
In such cases a different Client shortcut can be generated for each connection mode using the *Create shortcut* button in the *Connection settings* dialog. Although this is the preferred method for generating shortcuts, it might be useful to know that the generated shortcuts will use one or more of the following command line parameters:

- **connect:** the host name or IP of the Server;
- **port:** the TCP port number;
- **compression:** the JPEG compression used for sending the preview images over the network (0 = no compression, 1–100 = quality);
- **login:** the login name
- **password:** plain password;
- **encodedpassword:** encoded password (generated by the *Create shortcut* button in the *Connection settings* dialog);
- **language:** the code of the requested language;
- **fullscreen:** starts up the Client in full screen mode.

The usage of the command line parameters is *RipClient.exe /ParameterName1: "ParameterValue1" /ParameterName2: "ParameterValue2"* etc.

### 3.1.4 Starting the Client for the first time

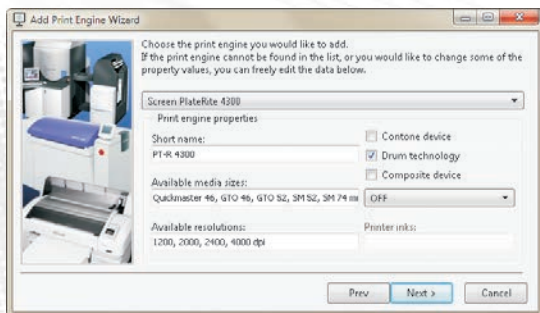
If the Client successfully connected to the Server, the *Add print engine wizard* will be launched automatically for first-time configuration. This wizard can also be launched manually at some later time from the *File* menu. As the print engine is already set up in the Print manager, the client will first try to connect to the Print manager and to acquire the print engine information. Therefore the Print manager should already be set up and running at this point (except in the case when no Print manager will be used).





The following choices are available:

- **Sharing the same computer with the server:** for default setup (one Print manager installed on the same PC as the Server); no additional settings are needed.
- **Different computer (name or IP):** if the Print manager is on a different computer than the Server application, it will be necessary to specify the IP number or host name of that computer.
- **No Print manager:** if connecting to a third party TIFF catcher without a Print manager, specify the hot folder location of the TIFF catcher. The *[StudioRIP]* section in the path string will be replaced by the Server application to the path of the StudioRIP data folder.
- **Print manager instance index:** if more than one Print manager application is running on the same PC, it will be necessary to specify its instance index (1 for the first one, 2 for the second one, and so on). Changing the index will also modify the port number and the hot folder location automatically.
- **Print manager TCP port number:** normally it is automatically changed together with the *Print manager instance index* setting, change it manually only if a special setup is needed.
- **TIFF hot folder location:** the path of the hot folder expecting the TIFF files generated by StudioRIP. Normally the folder name is automatically changed together with the *Print manager instance index* setting. If Print manager runs on a network computer, the share name of the hot folder needs to be entered here, see [7.2.1 Installing Print manager on another computer \(page 113\)](#). If StudioRIP will be connected to a third party TIFF catcher without using the Print Manager, the path of the hot folder needs to be entered here.



**The hot folder location is relative to the Server. It may be easier to run the Client on the Server PC for this setup, to avoid confusion.**

- If the connection to the Print manager has succeeded, the print engine information will be retrieved and filled in automatically. If no Print manager is being used, the engine type will have to be specified at this point;
- Print engine properties can also be modified manually, or a custom print engine can be created by filling out the fields;
- The **Short name** field is the device name used in StudioRIP's user interface (so it's preferred to be short indeed, e.g. use *PT-R 4300* instead of *Screen PlateRite 4300*);
- The **Available media sizes** field is a list of media widths (e.g. 14), media sizes (e.g. 12×18), sheet sizes (e.g. A3) or plate size (e.g. GTO SM74), separated by comma or semicolon (followed by space!). The measuring unit definition is at the end of the line (e.g. *in*, *cm*, *mm*). More complex definitions are also possible (margins can be defined in brackets after each size definition), but this is rather designed for pre-defined devices; for custom definitions, it's recommended that these are defined later in the *Job style* dialog.

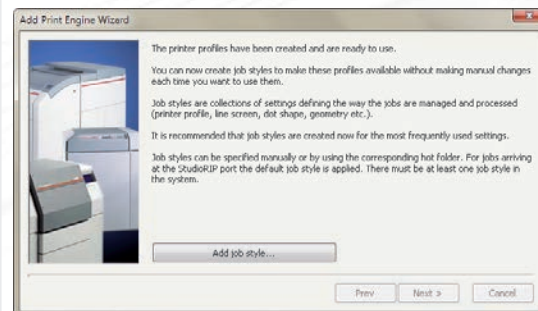
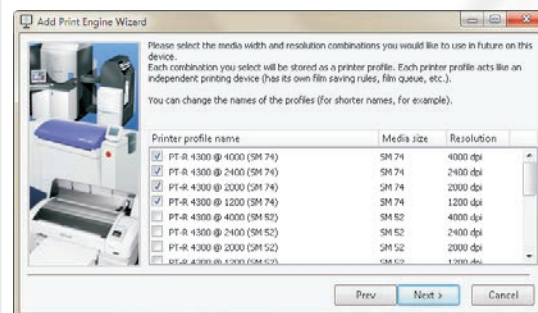
- The **Available resolutions** field is the list of the available device resolutions, separated by comma or semicolon, and closed by the measuring unit definition (*dpi* or *dpc*).
- The **Contone device** field specifies whether the print engine is, from the point of view of the RIP, a continuous tone device (i.e. expecting grayscale image data for its black/color channels), as opposed to most pre-press devices (CTP, imagesetter, inkjet and laser printers) which are generally seen as halftone devices (i.e. the RIP will use a screening technique to reach continuous tone image). For example, StudioRIP's OKI driver does the halftoning internally, so the RIP sees it as a contone device, sending 16-bit image data for each CMYK channel to the driver.
- The **Composite device** field specifies whether the print engine is color (e.g. inkjet printer) or monochrome (e.g. CTP, imagesetter, laser printer). Note that composite devices may be used as monochrome, for example inkjet printers with inkjet films, in which case this field needs to be unchecked.
- The **Printer inks** field specifies the inks (colorants) used by the composite device (on certain models, in a specific order). Each colorant is described by one of the following characters: C, M, Y, K, c, m, y, k or l. For example, *KCMYcm* means that the printer has black, cyan, magenta, yellow, light cyan and light magenta colorants, and it expects the printing information to arrive in this order.
- The wizard will automatically create job styles for the resolutions and media sizes selected in the window; check only the combinations that are necessary, thereby avoiding overcrowded lists later.
- Further job styles can be created later with the *Create copy* button of the *Job styles* docker. See chapter 6.1 *Job styles* (page 66) for further details.

## 3.2 SETTING UP THE NETWORK PRINTERS

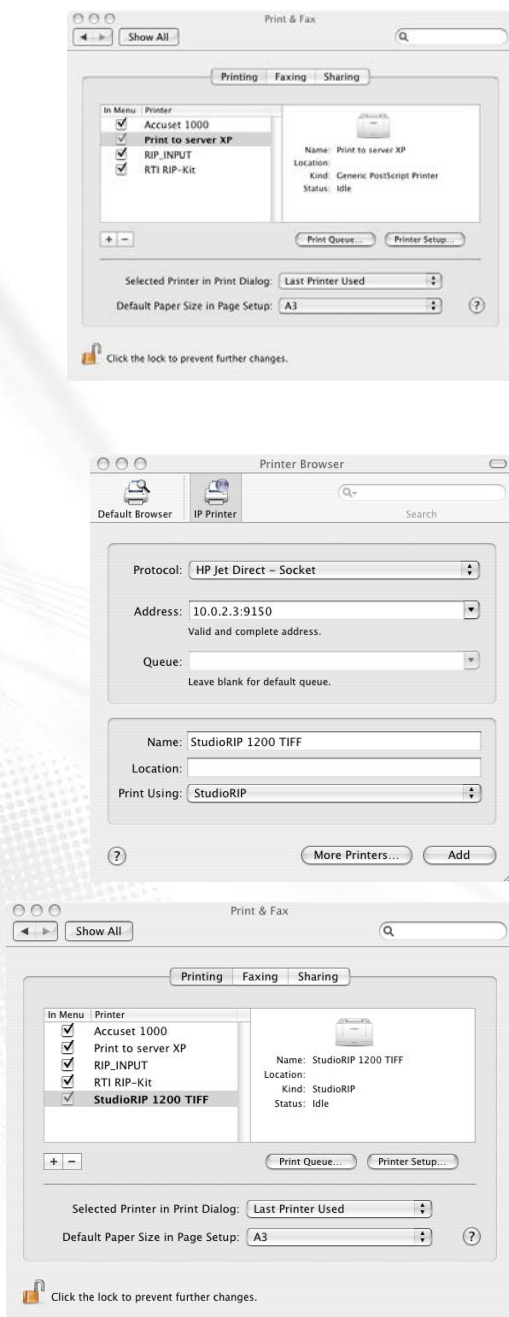
### 3.2.1 Sharing the network printers

By default, StudioRIP will automatically create a shared Windows printer for each job style created (these printers can then be used from any Windows application on the PC or from the network). This behavior can be turned off by checking the *Limit number of printers* box in the *Tools* → *Server options* dialog, and specifying the maximum number of printers that will be automatically created. The *Share the created printers* box in the same dialog specifies whether the created printers will be visible from the network by default.

The settings above affect only the default values that the job styles are set to when a new job style is created, but they can be changed for each job style at creation time or even later. Also, the share name of the created printers can be edited in the properties of each job style (see 6.1 *Job styles* (page 66)). It is recommended that short share names are chosen if workstations running Mac or older Windows systems are to be connected.







### 3.2.2 Setting up socket input

In certain cases, accessing network printers might prove to be difficult (Mac users are often complaining of being unable to see shared PC printers). In such cases direct socket input can be the solution: the PC or Mac workstation will set up a *local* printer which will print to a TCP port. This will avoid the use of any network protocols above the TCP/IP layer, thus avoiding potential compatibility issues. Also, it will let the user install the Postscript driver locally, using only the PPD file (rather than downloading the driver through the network).

Setting up socket input does not need any special action taken by the user, TCP port numbers are assigned to StudioRIP printers by default (that is, to each job style that doesn't have printer creation turned off) incrementally from 9100 (the local printers also use the same socket input system). It is also possible to set up *only* socket input, without setting up the Windows printer, or to specify a desired TCP port number rather than the automatically assigned one (see [6.1.2 Job style window \(page 67\)](#)).

The TCP port number assigned to a job style can be seen in the *TCP port* field of the job style window. Note that this field is set to *auto* when the socket input is set up, and the assigned TCP port can be seen only on subsequent visualizations.

On client side, create a Postscript printer using a PPD file (which can be created using the *Save PPD file* button on the *Job styles* docker), then connect it to the IP number of the Server PC and the TCP port number of the job style. StudioRIP socket input uses the *Raw* protocol – that is, no protocol is used at all, the Postscript information is written directly to the TCP port, then the port is closed.

When printing from a Mac workstation, the Mac printer Queue can be setup as follows:

- open the printer setup utility found within the system preferences;
- add a printer (using the plus button);
- select the protocol and set up the address (either the server name or IP address followed by a colon and then the port number);
- fill the *Print using* field by the appropriate PPD (the one generated from *Job styles* docker as shown above is recommended);
- Click the *Add* button to add the printer the Print Manager List. This concludes the printer setup and it is now ready to be used.

*Note: The system of setting up may differ with different versions of Mac OSX but the principle remains the same for all versions.*

### 3.2.3 Setting up network printers on PC

Unless the operating system or a firewall is blocking them, the shared printers should be visible from the workstations. (Depending on which operating system is being used, look in either *Network*, *Network Neighborhood* or *My Network Places* and search for the server PC.) By right-clicking on its icon and choosing *Connect*, the drivers will be installed on the local PC, and a local printer will be created and connected to the shared printer on the server.

*Note:* Windows XP or newer systems may detect and install the shared network printers automatically. These will appear in the *Printers and faxes* window of the workstations. In this case manual installation will not be necessary.

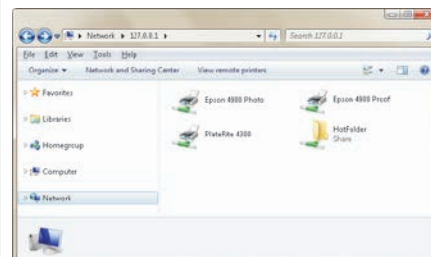
Once the network printers are installed on the workstation, they can be used just like any other network printers, and all the jobs sent to them will be captured by the StudioRIP Server application.

### 3.2.4 Setting up network printers on Mac

Mac workstations using OS X can use the shared network printers without modification. Use the *Add printer* utility to connect to the printer. Mac workstations using Mac OS 9 or earlier can also connect without modification if the StudioRIP Server is running on a PC with an NT Server OS (e.g. Windows 2003 Server), provided this has services for Macs installed (file and printer sharing). Neither of these cases needs third party applications.

If connecting to a network printer fails, consider using direct socket input (see [3.2.2 Setting up socket input \(page 33\)](#)).

**With Mac OS 9 running on the Mac workstations and XP (or other non-server OS, earlier than Windows Vista) on the server PC, Miramar PC MacLan or other third party software will be needed.**



## 3.3 SETTING UP THE HOT FOLDERS

Using the hot folder system is a fast and easy way to send previously created PDF or PS files from the workstations.

The working principle of the hot folder is the following: there is a root hot folder (located in the data folder specified during the installation, on Win8/Win7/Vista systems the default is *C:\ProgramData\StudioRIP\Hot folder*, and on XP systems the default is *C:\Documents and Settings\All Users\Application data\StudioRIP\Hot folder*), containing one folder for each job style, bearing the same name as the job style, keeping the same subfolder structure as the job styles themselves.

If files are dropped into these hot folders, they will be processed using the appropriate job style (i.e. bearing the same name and being within the same subfolder structure as the job style itself).

For example, if two job styles are being used named *170 lpi offset* and a *150 lpi flexo*, shortcuts can be created on the desktop to these two hot folders (created automatically by the StudioRIP in the root hot folder), and then any files dropped into these shortcuts will be processed with the appropriate job style.

### 3.3.1 Setting up the hot folders on a PC

On a PC, setting up the hot folders is done by a one-button click in the Client:

- Start the Client application and connect it to the Server.
- Go to the *Job styles* window.
- Highlight the job style to create a hot folder for.
- Press the *Create shortcut* button.

The shortcut to the hot folder will be created on the desktop. It can be moved if necessary.

### 3.3.2 Setting up the hot folders on Mac running OSX

First create any shortcuts on a PC (if there is no other PCs in the network, launch the Client on the server and create the shortcuts there). This will force the hot folders to be shared on the network (a folder named *HotFolder* will appear when browsing the Server from the network).

On the Mac: Use 'Go → Connect to Server', then browse to find the StudioRIP Server PC and its hot folder. Mount *HotFolder* and/or its subfolders. Each job style has its corresponding subfolder, bearing the same name. You may want to add aliases to these folders on the Desktop.

### 3.3.3 Setting up the hot folders on a Mac running OS 9 or earlier

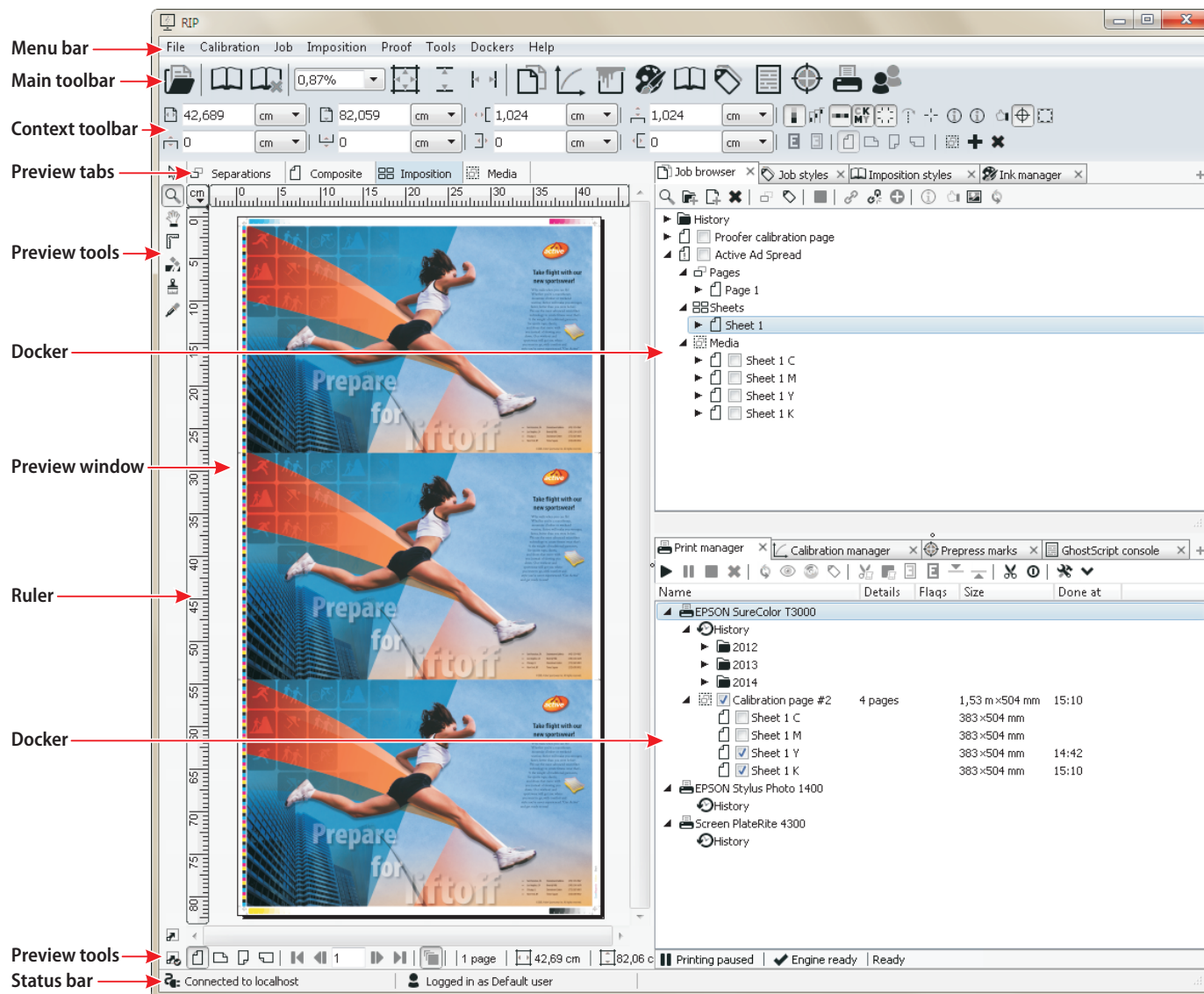
Using PC Macan (does not work on Vista or Win 7 – XP only) the subfolders of the hot folder (job styles) must first be shared on the StudioRIP server PC. (This is not the same as the built-in Windows sharing.) Right-mouse click on the folder to be shared, and select *Appletalk sharing*. Moving to the Mac: In the Chooser select Appleshare. The StudioRIP server PC (running Macan) should be visible. Highlight it and click OK.

The shared folders will now be listed. Select the correct folders from the list (ticking *Connect at startup* to avoid doing this every time the Mac is restarted). Each selected folder will now appear as a desktop icon.



4

# Finding your way around StudioRIP





The entire StudioRIP system is controlled by the Client application(s), which exhibit the integrated graphical user interface of the StudioRIP Server and Print manager applications. This chapter will present the Client application.

## 4.1 THE MAIN WINDOW

As shown on the picture on the next page, the main window contains the following controls:

- Menu bar, located at the top of the main window,
- Standard toolbar, located under the menu bar, containing buttons for common operations, such as *Open*,
- Context toolbar, changing its contents depending on the current view (separations, composite, imposition, media),
- Four preview windows for the four views; the view can be changed by the tabs at the top of the windows,
- 7 preview tools to the left of the preview windows,
- Preview settings bar under the preview windows,
- Two holders for dockers to the right of the preview windows (customizable),
- Two buttons (*Hide/show dockers* and *Auto-hide dockers*) controlling the behavior of the docker panel, see [4.2.7 Dockers menu <page 42>](#),
- Status bar at the bottom of the window.

## 4.2 MENU ITEMS

### 4.2.1 File menu

- **Open:** opens a PostScript, EPS, PDF, JPEG, BMP or TIFF file for processing. The opened file will be uploaded to the Server through the TCP communication channel, and processed.
- **Add print engine wizard:** starts the *Add print engine wizard*. See section [3.1.4 Starting the Client for the first time <page 30>](#) for more details.
- **New job style:** adds a new job style by showing the *Job style* window. See section [6.1 Job styles <page 66>](#) for more details.
- **Job styles:** shows the *Job styles* (docker) window. This window manages the available job styles in the StudioRIP system. If this window is docked to a holder, it will be brought to the foreground. See section [6.1 Job styles <page 66>](#) for more information.
- **Upgrade license:** opens the *License upgrade* window. This window allows the on-site update of StudioRIP. Contact your local dealer for more details on enabling currently disabled features.
- **Show licenses:** opens the *License* window. This window shows the options enabled on the

hard key, and therefore available with the current StudioRIP license. Contact your local dealer for more details on enabling currently disabled features.

- **Exit:** quits StudioRIP client only. The Server will still be running, and other users will be able to work through other connected Clients.

#### 4.2.2 Calibration menu

- **New calibration curve:** creates a new calibration curve by showing the *Calibration curve editor* window. See section [6.3.4 Calibration curve editor \(page 96\)](#) for details.
- **Print calibration page:** opens the *Print calibration page* window, used for printing calibrated or un-calibrated test pages. These pages can then be measured with a densitometer to create or check calibration curves. See section [6.3.2 Print calibration page \(page 95\)](#) for further details.
- **Dot gain compensation:** opens the *Dot gain compensation* window, used for adjusting the dot gain of the printing press to match an ICC profile. See section [6.4 Dot gain compensation \(page 99\)](#).
- **Calibration manager:** shows the *Calibration manager* (docker) window. This window manages the available calibration files in the StudioRIP system. If this window is docked to a holder, it will be brought to the foreground. See section [6.3.3 Calibration manager \(page 95\)](#) for more information.
- **Define new ink:** creates a new ink by showing the *Define ink* window. See section [6.5.2 Ink properties window \(page 103\)](#) section for details.
- **Ink manager:** shows the *Ink manager* (docker) window. This window manages the available inks in the StudioRIP system. If this window is docked to a holder, it will be brought to the foreground. See section [6.5.1 Ink manager window \(page 103\)](#) for further details and more information.
- **Add color profile:** adds a new ICC/ICM color profile to the StudioRIP system. See section [6.2 Color profiles \(page 93\)](#) for details.
- **Color profiles:** shows the *Color profiles* (docker) window. This window manages the available ICC/ICM color profiles available in the StudioRIP system. If this window is docked to a holder, it will be brought to the foreground. See section [6.2 Color profiles \(page 93\)](#) for more information.

#### 4.2.3 Job menu

- **Stop job:** stops processing the selected job, but the previously processed pages will remain available.
- **Delete job(s):** deletes the selected jobs in the *Job browser* window.
- **Combine jobs:** transforms the selected jobs into one job, containing all the pages of the original jobs.
- **Split job:** creates a new job, extracting the selected pages from the original job.



- **Merge plates:** merges the selected plates of a job, resulting in one plate. The source plates will be deleted, except the last one selected (the plate which is visible in the preview window), which will contain the result of the merge.
- **Export image:** exports one or more pages from the job to JPEG files. See section [5.4.1 Exporting to PDF or JPEG \(page 55\)](#).
- **Ink zone calculation:** calculates the ink coverage for each ink zone in order to adjust the ink ducts of an offset press. See section [5.4.2 Ink duct control \(page 56\)](#).
- **Job information:** displays the *Job information* window, containing information about the job, as well as the pre-flight warnings (if any).

#### 4.2.4 Imposition menu

- **Imposition:** opens the *Imposition* window, used for making new impositions, usually without saving the imposition style. See section [8.3 Imposition properties \(page 130\)](#) for more details.
- **Clear imposition:** removes the imposition, and initializes the job to its initial state (before any imposition).
- **Imposition styles:** shows the *Imposition styles* (docker) window. This window manages the available imposition styles in the StudioRIP system. If this window is docked to a holder, it will be brought to the foreground. See section [8.2 Imposition styles \(page 130\)](#) for more information.
- **Select pages on sheet:** selects all the objects (pages and pre-press marks) on an imposition sheet.
- **Add page to sheet:** adds a new page to an imposition sheet. See [8.4 Manual imposition \(page 133\)](#).
- **Delete selected pages on sheet:** deletes the selected pages on an imposition sheet. See [8.4 Manual imposition \(page 133\)](#).
- **Add prepress mark:** opens the *Add prepress mark* window, used for adding new, user-defined prepress marks. See section [8.5.2 Pre-press mark properties \(page 134\)](#) for more information.
- **Prepress marks:** shows the *Prepress marks* (docker) window. This window manages the available prepress marks in the StudioRIP system. If this window is docked to a holder, it will be brought to the foreground. See section [8.5.1 Pre-press marks manager \(page 134\)](#) for more information.
- **Crop with bleed:** shows the *Crop with bleed* window, used for cropping pages. The cropped parts will remain available as bleed. See section [8.6.3 Using the Crop with bleed command \(page 139\)](#) for more information.

#### 4.2.5 Proof menu

- **Proof:** prints a raster proof of one or more pages of a job on a proofing device. You need to have a raster proof job style created first. See sections [5.4.3 Proofing \(page 57\)](#) and [10.3 Printing proofs \(page 181\)](#) for details.
- **Spectrophotometer setup:** connects a spectrophotometer to StudioRIP. Spectrophotometers will be needed for setting up the proofer. As all wizards under the Proof menu will require an installed spectrophotometer, using the *Fake spectrophotometer* device could be useful in case you don't have one, and it is possible to perform an operation without an actual measurement. See [10.2.1 Spectrophotometer setup \(page 170\)](#) for further details and more information.
- **Proofer linearization wizard:** calibrates the proofer to give a linear output. See [10.2.2 Proofer linearization wizard \(page 171\)](#) for details.
- **Contone proof wizard:** profiles a color printer in contone printing mode, creates the ICC profile of the printer, and creates a contone proof job style. See [10.2.3 Contone proof wizard \(page 172\)](#) for details.
- **Halftone proof wizard:** profiles a color printer in halftone printing mode for the specified target job style, creates the ICC profile, and creates a halftone proof job style. See [10.2.4 Halftone proof wizard \(page 175\)](#) for details.
- **Raster proof wizard:** creates a raster proof job style, profiling the printer in raster proofing mode. [10.2.5 Raster proof wizard \(page 177\)](#) for details.
- **Test proof wizard:** tests the color accuracy of an ICC based proof job style. See [10.2.6 Test proof wizard \(page 180\)](#) for details.
- **Color checker:** compares a reference color (CMYK or Lab values) to a measured color, displaying the  $\Delta E$  result.

#### 4.2.6 Tools menu

- **Connection settings:** shows the *Connection settings* window, managing the settings of the Client–Server connection (such as IP address, JPEG compression etc.). The language of the Client can also be changed here (i.e. effective only locally). See section [6.8.2 Connection settings \(page 107\)](#) for further details.
- **Client options:** shows the *Client options* window, managing the settings of the Client application (i.e. effective only locally). See section [6.7 Client options \(page 105\)](#) for further details.
- **Server options:** shows the *Server options* window, managing the settings of the Server application (i.e. effective globally). See section [6.8.1 Server options \(page 106\)](#) for further details.

#### 4.2.7 Dockers menu

- **Hide/show dockers:** hides or shows the entire panel on the right side of the Client window, making the Preview window full width.

- **Auto-hide dockers:** hides the entire panel on the right side of the Client window automatically, making the Preview window full width, but automatically shows it if the mouse is moved to the right side of the Client window (similarly to the auto-hide taskbar feature of Windows).
- **Dockers:** show or hide the docker selected in the menu. If this window is floating or docked to a holder (even if hidden by another docker), it will be closed. If it is invisible, it will be shown (either as a floating window or as a docker, depending on the default state of the window).

For the description of the dockers, see [4.5 Dockers \(page 44\)](#).

#### 4.2.8 Help menu

- **User manual:** downloads and opens the StudioRIP user manual in the embedded PDF viewer of the default web browser.
- **StudioRIP on the web:** opens the StudioRIP home page.
- **About:** shows the version and copyright information of StudioRIP.

### 4.3 STANDARD TOOLBAR

Placing the mouse cursor over a button will trigger the display of the tool tip (a short explanation in yellow background) for the button. The standard toolbar contains mostly icons which are doubling menu items (such as *Open*, *Connect* etc.), explained in the previous chapter. However, there are a few icons and tools that were not described previously:

- **Zoom drop-down box:** sets and displays the zoom of the current preview. Values can be chosen from the list or entered from the keyboard, with or without the '%' sign. *Fit page*, *Fit width* and *Fit height* values are also available.
- **Zoom to fit:** sets the zoom to fit in the entire page.
- **Zoom to width/height:** sets the zoom to fit the width/height of the page.

### 4.4 PREVIEW WINDOW

The preview window allows jobs to be viewed before they are sent to the print engine. There are four levels of preview: *Separations*, *Composite*, *Imposition* and *Media*. The preview window shows the job or part of the job (e.g. page, sheet) that is currently selected in the *Job browser*.

See the description of the preview tools and preview settings bar in section [5.3.1 The viewer window and its controls \(page 51\)](#). See the descriptions of the four views in sections [5.3.2 on page 52](#), [5.3.3 on page 53](#), [5.3.4 on page 54](#) and [5.3.5 on page 54](#).

## 4.5 DOCKERS

StudioRIP uses several windows for managing styles, profiles, inks etc. These windows can be used as floating child windows or as dockers in one of the two holders, located at the right side of the Client window. The following operations are possible with these windows:

- **close a docked window:** click the × button on the right side of the window's tab;
- **create a docked window:** click the + button on the right end of the tab area, then choose the needed window from the list;
- **close a docker or floating window:** uncheck the appropriate item in the *Dockers* menu;
- **create a floating window:** check the appropriate item in the *Dockers* menu, or use the appropriate menu items or buttons if available (e.g. the *Job styles* window can be shown by its menu item in the *File* menu). Note that if the window already exists in docked state, first it has to be closed.

### 4.5.1 Job browser

This docker manages the jobs in the StudioRIP system. It allows you to:

- **select a job** by clicking on it. After a job has been selected, it can be previewed or other operations can be performed on it;
- **select pages of a job** by expanding the node of the job, and selecting a child node. This operation will update the preview window, as well as the current preview mode (e.g. selecting a composite page will change the preview mode to composite).
- **check a job** by clicking on its checkbox; this will send the job to the *Print manager* or to the third party TIFF catcher software for printing;
- **stop a job** by selecting it and then clicking on the *Stop* button; this will stop processing the job, but the already processed pages will remain available;
- **delete a job** by selecting it and then clicking on the *Delete* button or the *Delete* key of the keyboard;
- **combine jobs** by selecting them and then clicking on the *Combine jobs* button; this will transform the selected jobs into one job, containing all the pages of the original jobs;
- **split jobs** by selecting separations or composite pages of a job, and then clicking on the *Split job* button; this will create a new job, extracting the selected pages from the original job;
- **merge plates** by selecting separations pages of a job, and then clicking the *Merge plates* button; the selected plates will be merged into one plate. The source plates will be deleted, except the first (topmost) plate in the list, which will contain the result of the merge.
- **drag pages** within one job or from one job to another (allowed for separations and composite pages); this will move the dragged pages, changing their order or moving them from one job to another;
- **export JPEG or PDF preview images** of one or more pages of a job;

- **proof** of one or more pages of a job by printing it on a proofer;
- **reprocess jobs**, useful if a job needs to be processed with different settings (from the history or from the root job list), or it's been stopped;
- **browse the job history** by opening the *History* node of the job browser, where the printed jobs are grouped in years, months and days; archived jobs can be reprinted (without reprocessing), reprocessed by different settings, previewed etc.
- **view the pre-flight warnings** by clicking on the *Job information* button

For more information, see the following sections: [5.1 Opening a job \(page 48\)](#), [5.2 Processing a job \(page 50\)](#), [5.3 Previewing and changing job \(page 51\)](#) and [5.5 Sending a job to the Print manager \(page 59\)](#).

#### 4.5.2 Calibration manager

The calibration curves can be added, removed or edited in the *Calibration manager*. See section [6.3.3 Calibration manager \(page 95\)](#).

#### 4.5.3 Color profiles

The *Color profiles* window manages the ICC/ICM files present in the system. See section [6.2 Color profiles \(page 93\)](#).

#### 4.5.4 Ink manager

The inks known by the system are managed in the *Ink manager* window. See section [6.5.1 Ink manager window \(page 103\)](#).

#### 4.5.5 Imposition styles

The imposition window manages the imposition styles. Using this window, impositions can be added, removed or edited. See section [8.2 Imposition styles \(page 130\)](#).

#### 4.5.6 Job styles

The job styles specify how a job will be processed (resolution, screen frequency, dot size, geometry, in-rip separations etc.). These styles are managed in the *Job styles* window. See section [6.1.1 Job styles manager \(page 66\)](#).

#### 4.5.7 Ghostscript console

This window is the text output of the PostScript interpreter. Details about PostScript errors, as well as processing times and other information related to processing are available here.

#### 4.5.8 Pre-press marks

Pre-press marks can be added, removed or edited in the *Pre-press marks* window, allowing the user to use custom pre-press marks. See section [8.5.1 Pre-press marks manager \(page 134\)](#).

#### 4.5.9 Print manager

This window is the user interface of the Print manager application(s) in the StudioRIP system. If more than one Print manager is used in the system, each of them will be represented by a node in the tree. See section [5.6.1 The Print manager docker \(page 60\)](#).

#### 4.5.10 Users

The user accounts are managed in the *Users* window. See section [6.6.1 Users window \(page 104\)](#).



# 5 Printing a job

A job's route through the StudioRIP is as follows:

- A job can arrive to the StudioRIP Server in one of four ways: through the StudioRIP printers, through the hot folder system, through the direct socket input system, or by opening it with the Client;
- The job is queued in the *Job queue*, then processed;
- Unless the *Do not print until checked* option is turned on in the job style, the job will stay in the job browser list to allow the operator the chance to do tasks like preview, modify, impose, proof, export JPEG, calculate ink duct information, etc. It will be sent to the Print manager (or 3<sup>rd</sup> party TIFF catcher) only after it is marked as *checked* (by ticking the check box to the left of the job in the *Job browser*);
- If the job is checked, or the *Do not print until checked* option has been unchecked, the job will be sent to the Print manager. During this process the imposition, positioning and ganging are applied (resulting in re-bulit TIFF files), as well as certain workflow tasks (such as ink duct control, image export etc.) are performed. At the end of the process the job is removed from the root of the Job browser, getting archived into the Job browser's history, but arriving in the same time to the Print manager;
- Once it arrives at the Print manager, the processed job will be queued and printed (unless the print engine is not ready for printing, or the Print manager is paused);
- Finally, the Print manager version of the job will be archived once again in the Print manager's history, from where it can be retrieved for reprinting if necessary.

The following chapters will describe in detail the steps above.

## 5.1 OPENING A JOB

StudioRIP accepts PostScript or PDF jobs, either as PS/PDF files or as PostScript data coming through the StudioRIP printers.

The typical ways of opening jobs in StudioRIP are:

- Printing to a StudioRIP printer from an application;
- Exporting a job to a PDF file, and then opening the created PDF file with the Open command of the Client application or through the hot folder system;
- Generating a PostScript file (either by a special command of the DTP application, or selecting the *Print to file* option and printing to a StudioRIP or another PostScript printer), then opening the created PostScript file with the Open command of the Client application or through the hot folder system.

StudioRIP accepts either composite or separations jobs, but in most cases we recommend using composite: trapping is only possible on composite jobs, there is more control over the separation



process (overprints, for example), the processing speed is higher, and there are no problems with grouping separation plates into composite pages.

Technically, a job can be passed to the StudioRIP in four ways:

- Using the StudioRIP printers,
- Using the socket input system,
- Using the hot folder system,
- Opening the job by the *Open* command of the Client (or drag & drop over Client program's window).

#### 5.1.1 Using the StudioRIP printers

Unless having the *Limit number of printers* option checked or the *Share the created printers* option unchecked, StudioRIP will create and share a printer for each job style as they are added. For example, if a job style called *New job style* is created in the StudioRIP system, a printer called *StudioRIP – New job style* will be automatically added to the operating system, and becomes visible over the network as the *New job style* network printer. StudioRIP Server captures all the jobs printed on this printer, and will open them using the job style called *New job style*. In effect StudioRIP will act as a PostScript printer, any Windows program will be able to print directly to it.

Having the shared network printer created automatically, and unless there is a firewall or an operating system setting blocking the visibility of the printer, it is possible to print to this network printer from anywhere in the network.

To summarize, when printing to these printers from any application in the network, the print job will automatically be processed by StudioRIP. With the proper setup, it can be automatically printed too, without any user intervention.

#### 5.1.2 Using the socket input system

If connecting to a StudioRIP network printer from a workstation proves to be impossible due to operating system compatibility issues, try to use the socket input system. This method should work from any operating system with support for TCP/IP printer ports.

Perform the steps below on the workstation:

- Open the job style that you want the printer to send the jobs to from the *Job styles* docker, and go to the *Job input* task. If the *Enable the TCP port below* box is unchecked, check it, save the job style, then re-open it. Write down the TCP port number.
- Create a PostScript printer on the workstation (launching a PostScript driver installer or the appropriate operating system command).
- If during the setup the choice to specify a PPD file is offered, then use the PPD file exported with the *Save PPD file* button on the Job styles docker toolbar (note that when transferring PPDs from a PC to a Mac, the file extension has to be removed before it will work on

the Mac). Otherwise you may specify any generic PPDs, in most cases they don't have any influence on the result.

- Connect the created printer to a TCP/IP printer port (specifying the host name or IP address of the StudioRIP Server PC, and the TCP socket number of job style). As StudioRIP expects raw Postscript data on the socket input, turn off any optional upper layer protocols available (such as LPR or SNMP), and select RAW protocol if available (or equivalent).

### 5.1.3 Using the hot folder system

Using the hot folder system is the recommended way to process PostScript or PDF files, especially for pre-press studios that deal with files from different customers, all needing different job styles. Shortcuts to the corresponding hot folders of the job styles can be easily created in the *Job styles* docker using the *Create shortcut* button. See chapter 3.3 *Setting up the hot folders* (page 34) for more information.

Dropping a PDF, PS, EPS, TIFF, BMP or JPEG file into these hot folders (or dragging them to their shortcuts) will automatically pass the files to the StudioRIP. The files will be opened using the job style with the same name and under the same subfolder structure as the hot folder the job has been placed into.

### 5.1.4 Using the Open command of the Client

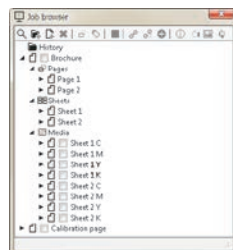
The *Open* command of the Client program is the best way to open a job and manually specify the job style. The job is loaded by the client (which sees the file system of the PC running it as local) and then it is transmitted to the server through the TCP connection between the Client and Server. This command may be slower than the hot folder system if the Client and the Server are on the same computer, because moving the file into the hot folder is normally instantaneous, while the *Open* command creates a copy of the file through a TCP channel.

*Note: that dragging & dropping the job icon over the Client program's window has the same effect as the job would open using the Open command.*

## 5.2 PROCESSING A JOB

### 5.2.1 The Job queue

The PS/PDF engine processes only one job at once. If jobs enter the StudioRIP system while the engine is busy processing another job, the incoming jobs will be marked as queued and will wait in the list. When the PS/PDF engine will become idle, it will take the first queued job in the list. The queued jobs appear in the root of the job browser, having an hourglass icon. The queued jobs can be deleted or moved (using drag & drop) in order to change their processing order.



### 5.2.2 Processing phase

A blinking arrow indicates that a job is being processed. To follow the processing progress, select the job in the *Job browser* list by clicking on its name. A progress bar and other information will be then available in the status bar of the *Job browser* window.

Jobs can be stopped using the *Stop* button on the toolbar. The job will be stopped instantly.

As the pages of the job are processed, they appear in the job browser tree and can be previewed, even if there are other pages to process. They can also be deleted, changed, moved etc.

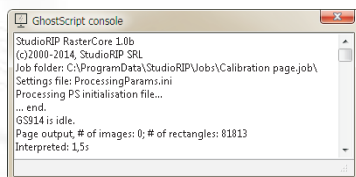
The job can also be sent for printing whilst it is still being processed, though this does not allow the possibility of verifying it on the screen or modify it.

### 5.2.3 Preflight warnings

StudioRIP will warn the user if potential errors are detected regarding a job, such as using the same screen angle on plates belonging to the same page, job sizes which exceed the media size, etc.

The preflight warning will appear as an exclamation mark in the job icon, colored background indicating more serious problem. The preflight warning reporting is fully customizable (typically a warning can be ignored, but remember that the severity cutoff level may have been changed), see section [6.7.2 Preflight tab \(page 105\)](#).

The warning can be viewed by selecting the job with the warning, then clicking on the *Job information* button above the window.



### 5.2.4 The Ghostscript console

It is possible to follow the messages of the PostScript/PDF engine in the Ghostscript console docker. Both `%stdout` and `%stderr` outputs are redirected to this window (including PostScript errors or warnings). In addition, details of processing – e.g. rendering times – will appear here.



## 5.3 PREVIEWING AND CHANGING JOB

A job can be previewed by clicking on its listing in the *Job browser* tree view. The preview will appear in the viewer window on the left.

### 5.3.1 The viewer window and its controls

On the left of the windows there are 7 tools:

- **Arrow tool:** used to select or move pages, as well as to adjust the trim and bleed boxes of pages.
- **Zoom:** the default tool. Use the left mouse button to zoom in. Combining it with the CTRL key or using the right mouse button will zoom out of the image. Selecting a rectangular area on the image zooms to that area. Using the mouse wheel combined with the CTRL button will zoom in and out.

- **Hand tool:** moves the image within the viewing area without using the scroll bars; pressing and holding the space key will temporarily switch to the hand tool. Scrolling the image is also possible by using the mouse wheel with (horizontal) or without (vertical) the SHIFT key held down.
- **Measuring tool:** is used to measure the size or angle of a given area or line of the job; select the area or line to be measured with this tool (without releasing the mouse button). The width and height of the selected area, as well as the length and angle of the selected line is shown at the bottom of the window. This tool can be used for checking line screen angles too.
- **Paint white tool:** erases (by painting white) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects, for example).
- **Paint black tool:** fills (by painting black) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects on black background, for example)
- **Dotmeter tool:** measures the dot percentage (halftone) or grayscale value (contone) at the cursor position. Note that on halftone jobs it averages an area for accurate results, so the dot percentage of thin objects (small font, line etc.) cannot be determined with this tool. On jobs with calibration curves applied the tool shows the original percentage (as in the PS/PDF file), but in paranthesis it shows the actual calibrated value too (as it is measured in the 1-bit TIFF file).

The preview window has the following controls (located around the window):

- **Horizontal and vertical measures:** change the measuring units by clicking the button in the upper-left corner;
- **Four view orientation buttons:** change the viewing orientation, without changing the job itself (very useful for checking vertical or upside-down texts);
- **Page number box and navigation buttons:** change which page to view with these controls;
- **Show in color button:** only available for the separated views (separations and media); specifies whether a separation page will be shown as black & white or in its original color;
- **Labels:** show the size of the displayed page, or the results of the measuring tool.

Changing the color view mode or preview orientation does not change the output, these are just preview options!

### 5.3.2 Separations view

The separation view shows the pages of the job as separations, in black & white or in their original color. Separated pages can be viewed even if the input job was composite.

Switch to separations view either by clicking the *Separations* tab above the view window, or by expanding the *Separations* node under the node of the job in the *Job browser*, then clicking on any separation of the page.

Separation pages can be deleted or moved within the job or to another job. If there are unwanted

Resolution (dpi):	4800	Dot type:	Round
Screen frequency (lpi):	175	Angle:	45

ed separation pages in the job, remove them by selecting them in the *Job browser* and then clicking the *Delete* button on the toolbar or pressing it on the keyboard.

In the separations view, the toolbar contains some general information about the currently viewed separation:

- Resolution (in dpi),
- Dot type,
- Screen frequency (in lpi),
- Screen angle (in degrees).

The separations can be viewed as black and white or in their true colors by the *Show in color* button, located at the bottom of the view window.

### 5.3.3 Composite view

The composite view shows the pages of the job as composite color pages, even if the input job was pre-separated. Apart from the standard CMYK, custom colors can also be seen in their true colors. Switch to composite view either by clicking the *Composite* tab above the preview window, or by expanding the *Composite* node under the node of the job in the *Job browser*, then clicking on a separation page.

Composite pages can be deleted, moved within the job or to another job. If there are unwanted composite pages in the job, remove them by selecting them in the *Job browser* and then clicking the *Delete* button on the toolbar or pressing it on the keyboard.

If you want to temporarily hide a channel (e.g. to hide the black channel to see whether the text is black only), click on the button of the channel (in this example, on the button of the black channel) located on the toolbar. This will just hide the color in the preview rather than modifying the output in any way. Another click on the button will show the channel again.

It is also possible to change the colors of the channels by clicking on the arrow in the right side of the channel buttons, and selecting the desired color from the list. This can be useful when the designer specified wrong colors (e.g. *Cyan* instead of *Pantone 300 C*).

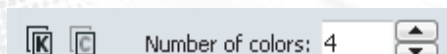
A composite page is a collection of separation pages, which can be seen under its *Job browser* node. It is possible to delete or drag in/out separations to/from a composite page.

The control bar indicates the settings of the currently viewed composite page. If there are multiple pages selected in the job browser, any change made on the control bar will be applied to all selected pages.

When no pages are explicitly selected, the program will treat all the pages in the job as being selected, so changes will affect the entire job rather than just the currently viewed page.

Here are a few simple examples of how to change the job with this control:

- StudioRIP recognized the pre-separated pages of a CMYK job as monochrome pages: press the *Apply CMYK colors* button on the composite toolbar, which will group the separations into CMYK pages.





- Spot colors were sent as process colors (e.g. *Pantone 300 C* as cyan), and the process colors now need to be replaced by the intended spot colors. Choose a previously defined color from the drop-down list by clicking the arrow near the corresponding button.

#### 5.3.4 Imposition view

The imposition view is intended to show the sheet in the way it will be printed by the press (or other printing device); in this view it is possible to add pre-press marks or create complex impositions.

Note that jobs with bleed may use the trimmed size by default, rather than the full processed size (depending on the job style settings – checking the *Imposition* option will do this by default), in which case neither of the preview windows will show the full processed size (in other words, the bleed will remain hidden). Only the parts of the bleed that fit on the sheet are visible; impositions will generally create space for the bleed to show (by increasing the sheet and leaving gutters). See [8.6 Bleed \(page 137\)](#) for further information.

Switch to imposition view either by clicking the *Imposition* tab above the view window, or by expanding the *Imposition* node under the node of the job in the *Job browser*, then clicking on a single page.

For a deeper understanding of how the imposition works, we recommend reading chapter [8 on page 127](#).

#### 5.3.5 Media view

The media view shows how the jobs will be arranged on the media. Switch to media view either by clicking the *Media* tab above the view window, or by expanding the *Media* node under the node of the job in the *Job browser*, then clicking on a single page.

**This is the only preview where the effects of the mirror and negative settings are visible, in order to keep the readability and accurate colors of the other three previews.**

The media settings (size, media saving etc.) which influence the placement of jobs on the media are stored in the job style. However, there are shortcuts to the two most important settings of the job style that affect the way the jobs are arranged on the media: the page placement, the orientation and the mirror/negative buttons can be accessed via the controls on the toolbar.

The *Show in color* button will help visualize how the different colors are placed on the media (even if on monochrome devices like imagesetters they are really coming out as black).

**Changing the negative state of the job at this level is not recommended if there are calibration curves involved. Calibration curves must be applied in a different way for negative jobs during the halftoning process, therefore the negative option needs to be specified in the job style.**



### 5.4.1 Exporting to PDF or JPEG

StudioRIP is able to export pages of the jobs as PDF files or as BMP or JPEG pictures. The intended use of these files is soft proofing, and aren't recommended for further processing (the PDF files will also contain embedded JPEGs – or other bitmap data – rather than vector graphics). The (embedded) images are the same quality as the onscreen previewing system of StudioRIP:

- In case of halftone jobs, they are resampled from the original 1-bit TIFFs, therefore some degree of false moiré can occur, despite of the moiré filtering techniques applied.
- If *Color managed sRGB* output is chosen, the colors come through the ICC-based color management system, so the image has the color accuracy of a soft proof. However, color accuracy is achieved only on low zoom levels where the halftone is invisible, and the calibration curves are correctly neutralized.

Therefore these pictures can be extremely useful not just for checking the integrity of the page (texts, images), but also for checking the colors of the job.

The *Export image* command is in the *Job* menu, and is enabled if a job is selected. The following settings are available:

- **Resolution:** the resolution of the generated picture, defaulted to 150 dpi. Higher resolutions are possible, but are not recommended for several reasons (long processing time, large JPEG file, possible moiré problems).
- **Exported view:** specifies whether the composite, separations or imposition view of the job will be exported.
- **Color space:**
  - *Color managed sRGB:* recommended for color or content proofing. The job will be converted into the standardized sRGB color space, which will be displayed in the same way on calibrated monitors. In this mode the files will be well compressed and suitable for sending over the Internet.
  - *CMYK or N-color (PDF only):* recommended only if the separations need to be accessed separately. The separations of the job will be stored unchanged, so the displayed colors will depend on the CMYK working space setting of the PDF viewer application. As embedded images are compressed in a lossless manner in this mode, the file size will be significantly bigger.
- **Output type:** specifies whether a PDF, BMP or JPEG file will be exported. BMP and JPEG are available for *Color managed sRGB* only.

- **Exported pages:** the pages of the job to export (with all pages, current page or page range options).
- **Compression:** the quality of the JPEG compression, as a compromise between quality and file size.

After clicking the OK button, the save dialog box will appear.

#### 5.4.2 Ink duct control

The ink duct control feature can make the life of the offset printer much easier, and at the same time can offer more constant quality. StudioRIP is able to calculate the ink coverage for each ink zone of the page, belonging to each ink duct, and to:

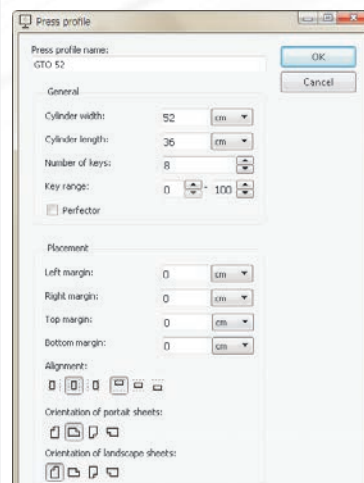
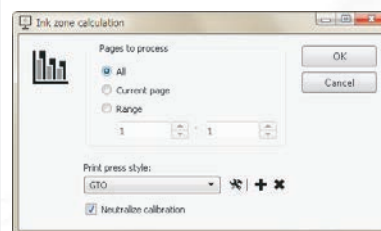
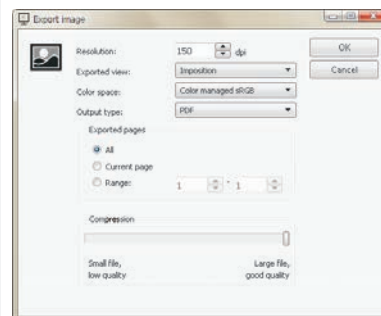
- print a diagram,
- export a PPF (CIP 3) or JDF (CIP 4) file (that will control the offset press directly)
- export a BMP or JPEG file (that third party software may use to control the press).

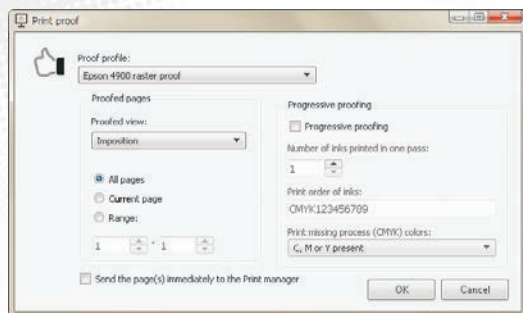
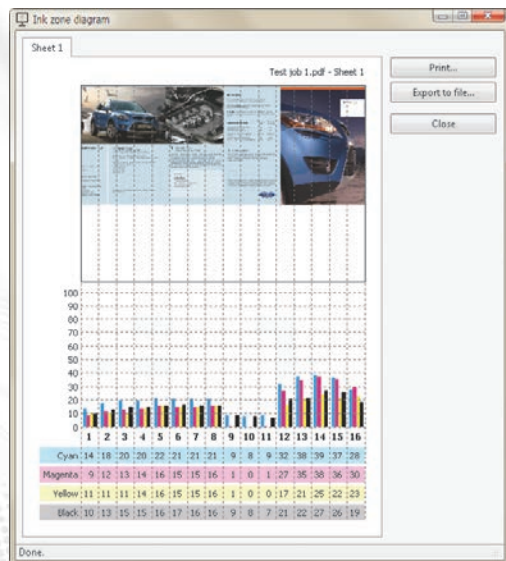
The ink duct control feature can be used either through the ink duct task of the job style, or by the *Ink zone calculation* command. The *Ink zone calculation* command is in the *Job* menu, and is enabled if a job is selected. The following settings are available:

- **Pages to process:** which pages of the job to calculate the ink zone information for (with all pages, current page or page range options).
- **Print press style:** specifies the cylinder size, number of keys and other parameters necessary for the ink duct calculations. The dialog allows the management of the print press styles with the edit, add and remove buttons.
- **Neutralize calibration:** recommended setting is on, to work with the intended shades (as in the DTP application) rather than the actual shades in the 1-bit TIFF file. Calibration curves might produce significant differences.

Print press styles can be added using the *Add* button in the right of the print press style drop-down box, or edited with the *Properties* button. The *Press profile* dialog has the following settings:

- **Cylinder width:** the width on which the ink keys are placed (the width of an ink zone will be equal to the cylinder width divided by the number of keys).
- **Cylinder length:** the length is measured on the cylinder circumference.
- **Number of keys:** the number of ink ducts on the offset press. In case of flexography, it is equal to 1.
- **Key range:** the minimum and maximum levels of ink duct keys. The default values are in percentages, but older printing presses may use different ranges (e.g. the minimum value is





2, the maximum value is 20). If such values are specified, StudioRIP will perform linear interpolation on the ink duct data to match the specified range.

- **Perfector:** set this option for perfector presses (i.e. printing the front and back of a sheet in one go), or if your system expects PPF files with the front and back side information specified and within the same file. Note that the setting doesn't have effect for diagrams or JDF output.
- **Left, right, top and bottom margins:** define the area on the plate where the job will be placed.
- **Alignment:** defines the horizontal and vertical placement of the job on the plate, relative to the margins defined above.
- **Orientation of portrait sheets:** if the orientation of the sheet in StudioRIP is portrait (that is, its width is less than its height), then the orientation setting chosen here will be used for the placement of the given job on the plate.
- **Orientation of landscape sheets:** if the orientation of the sheet in StudioRIP is landscape (that is, its width is longer than its height), then the orientation setting chosen here will be used for the placement of the given job on the plate.

Clicking the OK button of the *Ink zone calculation* dialog, the *Ink zone diagram* window will appear, and in a few seconds the diagram(s) will start to arrive from the Server.

The following choices are available:

- **Print:** prints the diagram on to a locally installed Windows printer (i.e. on the PC running the Client).
- **Export to file:** generates a PPF (CIP3), JDF (CIP4), BMP or JPEG file that can be used by newer models of offset presses.

### 5.4.3 Proofing

If the StudioRIP proofing system is properly set up, raster proofs of the jobs can be printed with the *Print proof* command in the *Proof* menu. The command is enabled only if a job is selected. Raster, halftone or contone proofs can be also printed through the *Proofing* task of the job styles.

The following options are available:

- **Proof job style:** a special job style created by the *Raster proof wizard*. See [10.2 Setting up the proofing system, page 170](#), for further information.
- **Proofed pages:** the pages of the job to proof (with all pages, current page or page range options).
- **Send the page(s) immediately to the Print manager:** if checked, the pages will start to be

printed immediately. Otherwise the user has the choice to verify how the job is placed on the media of the proofer.

- **Progressive proofing:** enables StudioRIP to simulate not just the final result of the printing process, but also the intermediate steps. For example, a printing press can print one ink at a time (in which case the progressive proofing of a CMYK job will show the four steps of the printing process: C, CM, CMY and CMYK), two inks at a time (in which case the progressive proofing will show the CM and CMYK steps), etc. The following settings will control the progressive proofing:

- *Progressive proofing:* will control whether progressive proofing is enabled;
- *Number of inks printed in one pass:* specifies the number of inks that the printing process can print in one pass;
- *Print order of inks:* specifies the order the CMYK and spot colors are printed. The digits specify the order of the spot colors. For example, the *CYMK213456789* string will instruct StudioRIP that the CMYK colors are printed in a different order (the magenta and yellow swapped), as well as the order of the first two spot colors are swapped relative to their order in StudioRIP.
- *Print missing process (CMYK) colors:* specifies what to do in a case where one or more of the 4 process colors are missing in the proofed job. The *Never* setting will not print missing process colors; the *C, M or Y present* option will print the missing process colors only if at least one non-black color is present (but will only print K if black is the only process color); the *C, M, Y or K* option will print the missing process colors if any process color is present; the *Always* option will always print all four CMYK colors, regardless of whether they are present or not.

The effect of the *Print proof* command is that the selected page(s) will be copied into a new job having a proof job style. When sending jobs from proof job styles, StudioRIP will embed all the necessary information for proofing into the outgoing TIFF file, so that the Print manager will be able to apply the right color management when printing the job. See chapter [10 on page 165](#) for a deeper understanding of how the StudioRIP proofing system works.

#### 5.4.4 Imposition

StudioRIP has a post-RIP imposition system. This means that the imposition is done *after* the jobs have been processed, i.e. when they are in the job browser. See chapter [8 on page 127](#) for a deeper understanding of how the StudioRIP imposition system works.

#### 5.4.5 Retouching

Minor retouching tasks (such as erasing unnecessary objects on white or black background) can be easily done with StudioRIP even after processing.

Note that at this phase the job doesn't contain vector objects anymore, it is now one high res-

olution bitmap. Therefore retouching isn't object based (e.g. a text object on a bitmap cannot be removed); it is only able to paint white or black rectangles over the image.

Retouching works for separations or composite pages. Using it on separations is useful when only certain plates need to be modified (for example, deleting the CMY components of a text, keeping just the black one).

There are two tools available for retouching at the left of the preview window:

- **Paint white tool:** erases (by painting white) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects, for example).
- **Paint black tool:** fills (by painting black) areas on separations or composite pages. Useful for retouching pages (deleting unneeded texts or objects on solid color background, for example).

## 5.5 SENDING A JOB TO THE PRINT MANAGER

After the job has been modified and/or verified, it can be marked as checked. However, if the *Do not print until checked* option is off in the job style being used, the job (or page of the job) will be printed immediately when there are enough pages processed to start printing.

An understanding of what happens to a job when it leaves the job browser is important. This is the phase when all the manual or automatic modifications applied to the job are rendered (such as pre-press marks, imposition, media saving or automatic rotation). This is also the phase when the job data finally leaves the Server and is passed to the Print manager or to the third party TIFF catcher software (which may be installed on another computer) – although a copy of the job remains stored in the *Job browser history*.

During this process, the source TIFF files have to be read, combined and written to a single destination TIFF file. This may take a few seconds for each page (possibly even longer; the transfer time is a function of the connection speed between the Server and the Print manager, the computer's speed, the file sizes, and the complexity of the rendering operations to perform, such as rotating a page).

When media saving is turned on, a job will only be sent to the Print manager when there is absolute certainty that a following page cannot fit on the same piece of media. To achieve this, the first page will be held until the subsequent page is processed and has been assessed to see whether it will fit onto the media with the current page.

Note that media saving only works within a single job. To allow media saving to put two pages, from different jobs, on the same piece of media, it will be necessary combine the jobs with the *Combine jobs* button on the *Job browser* toolbar.



## 5.6 IMAGING A JOB WITH THE PRINT MANAGER

### 5.6.1 The Print manager docker

The recommended way of using StudioRIP is with the Print manager as the interface between the RIP and the print engine wherever possible. The alternative is to use third party software that will accept 1-bit TIFF files into a hot folder (a TIFF catcher), in which case the use of the Print manager is optional (StudioRIP can be configured either to send the TIFF files directly from the Server to the TIFF catcher, or indirectly, through the Print manager).

If Print manager is being used, it can be controlled directly from the Client, making many useful features available. The Client can control several Print managers in one window, each Print manager having its own icon in the Client's Print manager docker. The Client connects to the Print manager(s) through the StudioRIP Server application, so no additional data channels are needed even if some of the Print managers are on different computers.

### 5.6.2 Receiving jobs in the Print manager

The Print manager has a hot folder which it checks for newly arrived jobs. The jobs have to be TIFF pages, uncompressed or compressed with Packbits, Packwords (StudioRIP's internal format for 16-bit contone images), CCITT G4, LZW or CCITT G3-1D schemes. The received jobs will automatically appear in the job list, so the fact that there are two programs working together, even on different computers, will be completely transparent from the Client workstation.

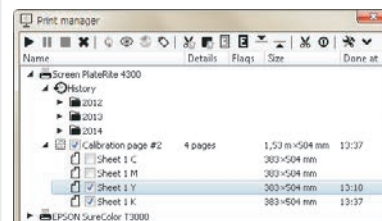
Pages coming from the StudioRIP Server will contain additional data, which helps the Print manager recombine them as jobs, recognize their colors, etc. Pages coming from third party applications will be shown as different jobs.

### 5.6.3 Starting the imaging

Once received, the job will start to be imaged automatically, provided that all the program parts are installed and the print engine is ready – no user intervention is needed.

At this point, the Print manager will be in one of the following states:

- The job is being printed. Status bar message: *Imaging*.
- The job is waiting in the queue because the Print manager was paused. Status bar message: *Printing paused*.
- The job cannot be printed because the engine is not in a *Ready* state. The status bar will show further explanations (e.g. *Engine error*, *Engine not found*, *Searching for EtherSetter box*).
- The job cannot be printed because there is no connection with the Print manager. Status bar message: *No Print manager*.





#### 5.6.4 Pause mode

Stop Print manager by clicking on its item in the *Print manager* docker (if there is more than one Print manager in the StudioRIP system) and then clicking on the *Pause* button in the toolbar. In this state the Print manager does not send anything to the engine, allowing time to arrange jobs, check the print engine, wait for a confirmation, etc., while it will continue to receive jobs that are sent to it and StudioRIP will continue to process jobs and put them safely into the Print manager queue. The only way to leave this state is by clicking the *Start* button.

*Note:* If there is more than one Print manager, each of them has its own state; stopping one will not stop the others.

Print manager will automatically enter *Pause* mode if:

- On startup it detects that there are jobs in the queue,
- A print engine error occurs,
- The last printed job was marked either with a *Cut* flag or *Stop after page* flag.

**The Start and Pause buttons change the state of the selected Print manager rather than of the selected job(s).**

#### 5.6.5 Changing the job list

The job list in the Print manager window can be manipulated by the user in multiple ways. It is possible to:

- **Un-check** (in order to not print) or **check** (in order to re-print) entire jobs or pages of the jobs in the list;
- **Delete** pages or jobs by selecting them and pressing the *Delete* button;
- **Move jobs** in the list to change their orders with drag & drop;
- **Move pages** with drag & drop, including from job to job;

The tick mark near the job or page icon shows whether the page is ready for imaging or not. By default the jobs/pages are always ticked when they arrive in the list (i.e. they will be printed without user intervention), but:

- they can be un-ticked by the user in order to prevent printing a page at all, or to wait for a confirmation,
- pages are progressively un-ticked by the Print manager as they are imaged.

After a page is imaged, the Print manager will search for the first ticked page in the list, and will start to image it. As they are progressively un-ticked, the pages will be imaged in their natural order, except when the list has been changed by the user:

- a job has been dragged and dropped in front of the currently imaged page,
- the currently imaged job has been dragged behind another job,
- a page or job has been ticked before the currently imaged page.

#### 5.6.6 Finishing the imaging

If a page has been imaged, the container job will be checked for removal. A job is removed from the list when one of its pages finished imaging successfully, and there are no more checked pages in the job. This means that:

- A job may be removed even if some of its pages may not have been imaged at all (if they were unchecked by the operator),
- Unchecked jobs can stay in the list indefinitely, waiting to be checked.

The imaged jobs will be stored in the History, available under the History node of the Print manager window, grouped based on the year, month and day of printing. These jobs then can be:

- Previewed again by the *View* button (located on the toolbar of the Print manager docker),
- Imaged again by the *Reprint* button (also on the toolbar of the docker),
- Searched for in the record of the Print manager even if the job has been physically erased from the hard disk – information like name, size, color, date will be stored and never erased.

#### 5.6.7 Commands and job flags

Jobs or pages of the jobs can be marked with the following flags:

- **Mirror** flag prints the pages of the jobs mirrored in the fast scan direction (wrong reading);
- **Negative** flag prints the pages in negative;
- **Cut after page** flag will cut the media after printing the marked page or the last page of the marked job. The media will be cut and the Print manager will go into *Paused* state;
- **Stop after page** flag will put the Print manager into *Paused* state.

The mirror and negative flags will be passed to the driver, which will try to apply them at hardware level if available (e.g. Agfa imagesetters support both mirrored and negative imaging), otherwise they will be applied directly to the image data.

There are a few additional commands in the Print manager:

- **Cut the media** manually by clicking the *Cut* button,
- **Reset** the print engine with the *Reset* button,
- **Edit the settings** of the print engine by clicking the *Engine properties* button.

Note that some of these features may not be available on all machines.

### 5.6.8 Print manager history

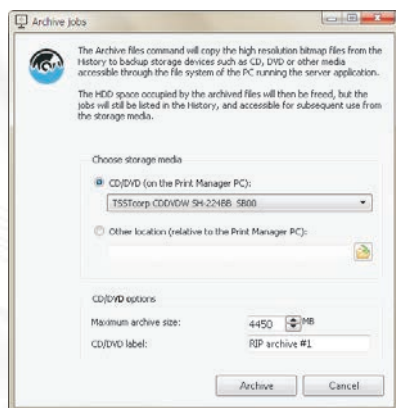
Printed jobs are held in the History for a preset period (see chapter 7.1 *Configuration* (page 110) about the cleanup strategies of the Print manager). Whilst they are held, they can be reprinted entirely or partially, with no need to re-rip them.

A full list of all the printed jobs (containing their characteristics, such as the size of the job, the date it was printed, etc.) is never deleted (as it occupies insignificant disc space), but is stored as a permanent archive of all the jobs imaged through the StudioRIP Print manager. Once the actual job data has been deleted from the history, its listing will appear as grayed out; these files cannot be reprinted.

To view or reprint jobs or pages, select them in the history list, and then click the *View* or *Reprint* buttons on the toolbar. This is possible only if the jobs are still on the hard disk (do not appear as grayed out in the list).

If the media saving has grouped two separations into one TIFF (for example, a cyan and a magenta plate together), then it will not be possible to view it as a single color page. However, if the plates were kept separately (which is the case of platesetters, for example), the job will be recombined into a color job.

It is not recommended though to reprint jobs by viewing them and then sending them back to the Print manager, because the positioning system may change (typically shift) the image – use the *Reprint* command instead, or use the history of the *Job browser*.



### 5.6.9 Archiving files

Files from the History can be archived to DVD. The archived job will appear in the History with a DVD icon, and will be available for reprint or viewing like the regular History jobs, but at any attempt to access them a window will appear asking for the right DVD to be inserted into the PC.

To archive jobs from the History, select years, months, days, jobs or pages of jobs, and then click the *Archive* button. The *Archive jobs* window will appear. Choose the DVD writer drive you want to use, the maximum archive size (i.e. the size of the DVD), and a label that you will use to identify the DVD later, then click the *Archive* button.

If the selected jobs do not fit on the DVD, they will be archived only partially. You can then continue archiving the selected jobs by inserting another blank DVD, the previously archived jobs will not be archived again.

### 5.6.10 Cassette manager

The Cassette manager toolbar can be shown or hidden by the *Show cassette manager* button on the toolbar of the *Print manager* docker.

The Cassette manager is particularly useful if the print engine is roll fed. It shows the amount of media remaining in the supply cassette, as well as the amount of media inserted in the take-

up cassette (on engines with online processor, this usually shows the amount of media on the bridge).

When loading a new roll of media, be sure to enter the amount of loaded media by entering the number in the *Supply cassette* box, and then pressing Enter.

Note that Cassette manager functionality is print engine dependent and may not, or only partially, work on some engines.

#### **5.6.11 Duplex mode buttons**

Certain devices (e.g. OKI printers) support duplex printing. On these devices it is possible to control whether a page is printed on the front or back side of a sheet. When the back side flag is specified with a page, the printer will print that page on the back of a sheet even if this means to leave the front side of the next sheet empty. The front side flag has a similar effect.

These flags can be turned on and off with the two duplex mode buttons located on the Print manager toolbar.

# 6

## Configuring StudioRIP

## 6.1 JOB STYLES

Job styles hold the parameters of how each workflow task (interpretation, trapping, proofing etc.) has to be performed. It is similar to the *page setup* or *job ticket* concepts of other workflows.

Each job in StudioRIP has its job style information attached – either one of the defined job styles in the StudioRIP system, a job style loaded from file, or edited on per job level after a manual open command.

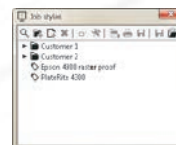
The rules of attaching job styles to jobs are as follows:

- For jobs coming through a StudioRIP printer, the job style that the printer belongs to will be attached to the job. For example, printing to the *StudioRIP – Offset 170 lpi* printer will attach the job style called *Offset 170 lpi* to the opened job.
- For jobs dropped in a subfolder of the hot folder – see 3.3 *Setting up the hot folders (page 34)* – the job style that the hot folder belongs to will be attached to the job. For example, placing a file into the subfolder called *Offset 170 lpi* will attach the job style called *Offset 170 lpi* to the opened job.
- For jobs opened with the *Open* command in a Client, the job style window will appear (if the *Ask for job style on open* option in the *Client settings* is checked), and the settings specified in this instance of the *Job style* dialog box will be applied (these settings can be temporary, in which case there is no need to save them).

In most cases the job styles are stored as a simple list, but in the case of a large number of job styles, they can be structured in a folder structure. The job styles placed in hot folders are referred in StudioRIP in an identical way as in Windows, i.e. the container folder(s) will appear before the job style name, separated by backslash characters (e.g. *John\Small plates\175 lpi*).

### 6.1.1 Job styles manager

The job styles are managed in the *Job styles* window. Though the job styles are arranged and displayed in a tree structure (job styles belonging to a group will be displayed under the tree nodes representing the job style groups), in most cases the tree structure will look like a simple list: by default no folders are defined, and therefore the job styles will be displayed in the root of the tree. The following operations are allowed:



- **Find** job styles (useful in the case of a large number of job styles).
- **Create folder** to store job styles or further folderst in. To create a sub-folder of an existing folder, select the folder in which the subfolder will be added before clicking the *Create folder* button.
- **Add, remove** or **edit** job styles by clicking the appropriate buttons in the toolbar of the *Job styles* docker.
- **Create a copy** of a job style, useful to create a job style similar to a reference.
- **Create a shortcut** to the hot folder of the selected job style by the *Create shortcut to hot fold-*



er button. The shortcut will be created to the desktop. If a shortcut with the same name exists, it will be overwritten.

- **Print a calibration page** with the settings of the selected style by the *Print calibration page* button.
- **Save PPD file:** useful in conjunction with the socket input system, when the workstations will install generic Postscript printers which require a PPD file.
- **Export a job style:** offers the choice of embedding all referenced files into the created job style file (such as ICC profiles, calibration curves, press profiles etc.), ensuring that the exported job style will act in the same way on a different StudioRIP installation.
- **Import a job style:** imports job style files exported with the previous command, also offering the choice of importing the embedded files. The import uses a smart algorithm: if a file with the same name as the the imported file already exists in the system, they will be compared, and in case they are different, the new file will be imported with a different name.

The job style import/export commands replace the import/export functionality of proof settings in version 3 of StudioRIP. An exported proof job style will have embedded the proof linearization curve, ICC profile, color correction profile etc., so it is perfectly portable from one StudioRIP installation to the other.

When adding or editing a job style, the *Job style* window will appear.

#### 6.1.2 Job style window

The job style window will appear whenever a job style is created or modified, as well as when a job is opened by the *Open* command, and the *Ask for job style on open* option is checked in the *Client options* dialog, or when the *Properties* button of the *Job browser* docker is clicked (double clicking a job has the same effect).

The job style window has the following controls:

- **Job style name:** the name of the job style, as it will displayed in the *Job style manager*, and as the StudioRIP printers will be created.
- **Import button:** similar to the import button of the *Job styles* docker, but instead of creating a new job style item in the *Job styles* docker, it only fills in the controls of the dialog – useful in the *Open* dialog, allowing to open a job with an externally stored job style.
- **Export button:** similar to the export button of the *Job style* docker, but exports the current state of the job style dialog instead of a saved job style – useful for saving the job style of a job in the *Job browser* list.
- **Workflow tasks:** contains the list of the available tasks that will be performed for the jobs opened with the given job style. Only the checked tasks (i.e. with the check box on the left of the task name ticked) will be executed. Certain tasks are grayed out because they must be (e.g. interpretation) or cannot be (e.g. screening for a contone job) executed in the given cir-

cumstances. Selecting a workflow task (i.e. clicking on the name of the task) will show the properties of that task in the right side of the *Job style* window.

- **Workflow task properties:** will show the properties of the selected workflow task. Each workflow task has its own set of properties. For a detailed description of the properties of each workflow task, see the following sections.
- **Do not show this dialog box on open:** will uncheck the *Ask for job style on open* option in the *Client options* dialog; as a result, the job style window will not appear when executing the *Open* command – the default job style will be used instead.

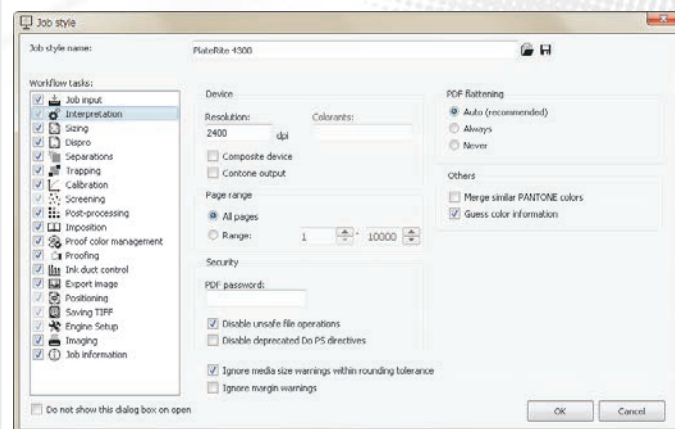
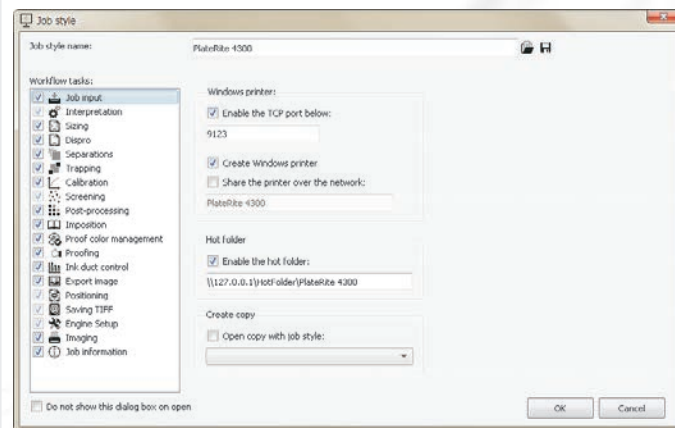
### 6.1.3 Job input task

Defines the ways a job can arrive into the StudioRIP system.

- **Enable the TCP port below:** specifies the TCP port number of the socket input (see [5.1.2 Using the socket input system \(page 49\)](#)). The value *auto*, as well as any non-numeric values (such as an empty field) will instruct the RIP to choose the first available TCP port above or equal to 9100. In such cases the subsequent visualizations of the job style will show the port chosen by the system.
- **Create Windows printer:** if checked, a standard Windows printer called *StudioRIP – Job-StyleName* will be created, allowing any Windows application to print directly to the StudioRIP system.
- **Share the printer over the network:** if checked, will set up the printer sharing of the above defined printer, so then any network workstation can print to the StudioRIP system. If older operating systems are used in the network, it is recommended that a short name is chosen (maximum 8 characters, without special characters). The icon in the right of the box will show whether the name is considered compatible with older systems.
- **Enable the hot folder:** if checked, will set up the hot folder of the job style. The name field is read only, showing the network path of the hot folder.
- **Open copy with job style:** if checked, the job will be opened again, with the specified job style, after the processing is done. It allows chained opening scenarios like job style A linking job style B, which on its turn links job style C. Useful if the same job needs to be printed twice (e.g. on a platesetter and a special proofing system).

### 6.1.4 Interpretation task

- **Resolution:** the device resolution, in dpi. In case of raster proof job styles, it is the resolution of the *target* device (typically an imagesetter or CTP) rather than the one of the proofer (typically an inkjet printer).
- **Colorants:** applies to composite devices only, specifies the colorants (inks/toners) of the device which can be used by StudioRIP: C (cyan), M (magenta), Y (yellow), K (black), c (light



cyan), *m* (light magenta), *k* (light black or gray), *l* (light light black or light gray). In addition, the colorants field may have a '2' suffix (e.g. *CMYKcm2*), specifying the ability of the device to use a second, smaller dot (droplet) size on the given resolution, improving the quality of the print in highlights. For example, the Epson Stylus Pro series will use two droplet sizes on 720 dpi (12.5 pl and 3.5 pl), but only 3.5 pl on 1440 dpi, resulting in a '2' suffix on 720 dpi and no suffix on 1440 dpi.

- **Composite device:** specifies whether the device is used as separations device (typically platesetter or filmsetter), or as composite (color) device (typically inkjet printers). If a color device is intended to be used as separations device (e.g. printing on transparency film for screen printing on an inkjet printer), this option has to be turned off.
- **Contone output:** specifies whether the device driver expects continuous tone data (i.e. without halftoning), either because the device is able to print shades of colorants directly, or – more likely – the halftoning process is done at TIFF catcher or driver level. For example, the OKI laser printer driver of StudioRIP expects contone data, as a special high frequency 5-bits halftone is used that is applied on driver level. Contone proofs are also sent by StudioRIP Server as contone TIFFs, the halftoning being done by the Print manger.
- **Page range:** specifies the pages of PDF files to process (by default all pages will be processed).
- **PDF password:** the user or owner password to be used to open a password protected PDF file.
- **Disable unsafe file operations:** instructs the PS interpreter module to ignore any file operations that may harm the computer (by design PostScript files are allowed to change or delete files in the system). Note that in Windows 8, Windows 7 or Vista environments the processing runs without administrator privileges anyway, so cannot harm the OS.
- **Disable deprecated Do PS directives:** Do PS directives allow applications embed native PS/EPS code in a PDF document. Since PS/EPS code may potentially harm your computer (see Disable unsafe file operations) these directives are deprecated, hence PDF reference recommends avoiding their usage.
- **Merge similar Pantone colors:** corrects for the very common error of mistakenly including the same Pantone color with slightly different names (e.g. PANTONE 339 C vs. PANTONE 339 CV). If plates with such names are detected, StudioRIP will automatically merge these plates into one single plate.
- **Guess color information:** if this option is on, the RIP will try to guess how to assign color information to the pages and how to group the separations in composite pages – in cases of PostScript files with poor or bad page and color information. This may not always work correctly, so if using programs which generate good PostScript files, the use of this option should not be necessary.
- **PDF flattening:** the transparency flattening policy of StudioRIP. It is recommended that it is left on 'Auto' to allow StudioRIP to check whether the job contains transparency or not. However, if the PDF contains either transparency the StudioRIP checking mechanism cannot detect or new features which are beyond current PDF handling implementation, it can

be set temporarily to 'Always'. Skipping the transparency check by setting the usage to 'Never' may slightly speed up the job processing but is not recommended for regular use.

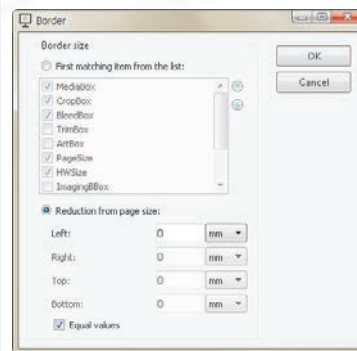
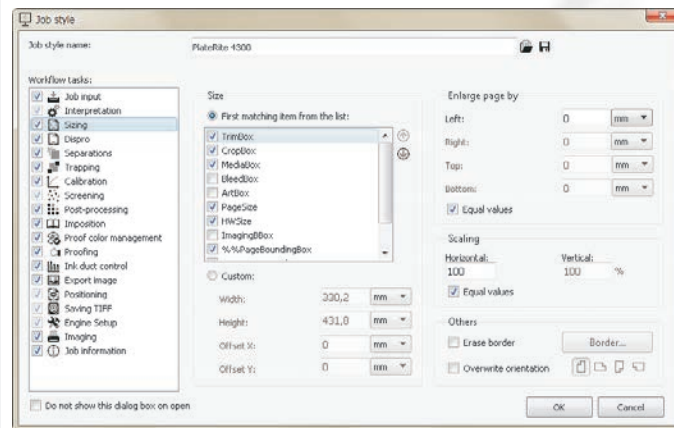
- **Ignore media size warning within rounding tolerance:** jobs with sizes that exceed the specified size only slightly – supposedly due to rounding issues – will be ignored by the media size warning mechanism.

### 6.1.5 Sizing task

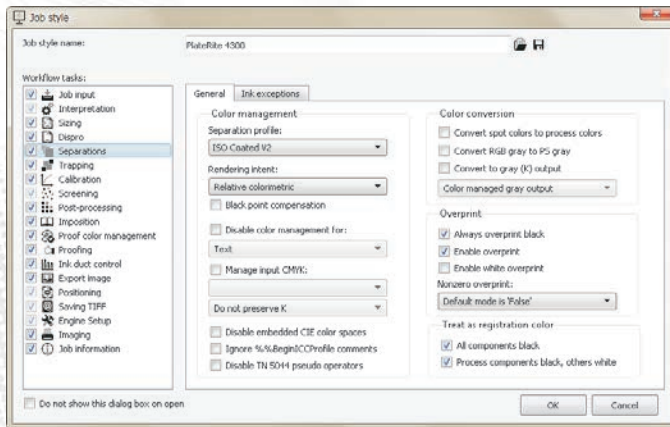
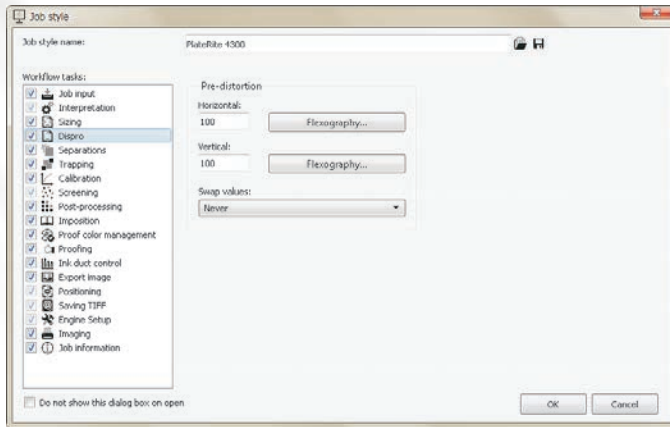
Turning the sizing task off will instruct StudioRIP to use the default page size. Turning it on, the following options will be available:

- **Size:** defines the entire processed size of the job (that is, the size of the effectively rasterized image information saved internally into the TIFF file). If the imposition task is turned off, this is the displayed and printed size of the job. If the imposition task is turned on, this may become (depending on the imposition task settings) the bleed size, i.e. displayed and printed only if the imposition allows it, see more in [8.6 Bleed \(page 137\)](#).
- **First matching item from the list:** will extract the size of the file from the various size declarations of the PostScript, PDF and EPS files. As their use by the various DTP and pre-press applications isn't very consistent, StudioRIP allows the user to fine tune the size extraction procedure to get the best possible result with their applications. StudioRIP will search for the first definition in the list that is ticked and also present in the PS/PDF/EPS file. The user can change the order of the size definitions, and can check or uncheck them. By default, the MediaBox definition is the most desirable one (first in the list and checked), but if it is not present in the file, StudioRIP will search for the CropBox, BleedBox, PageSize etc. definitions. If no match is found, the Custom size will be defaulted (*see below*).
- **Custom:** will set the page size directly, ignoring the page size definitions of the file. The *Width* and *Height* fields will define the size of the box, while the *OffsetX* and *OffsetY* fields will define the position of the box on the page (negative values allowed).
- **Enlarge page by:** enlarges the extracted/defined size. Useful for files with missing bleed definition, e.g. if the defined size is the trim size, enlarging the defined size by 5 mm will provide the needed bleed.
- **Scaling:** resizes the job by a given percent (100% meaning no resize). Both page size and page contents will be resized.
- **Erase border:** sets the border the StudioRIP won't mark outside of – either by using the *First matching item from the list* or specifying custom values (press the *Border...* button to select the appropriate option). If the option is unchecked, no portions will be erased.
- **Overwrite orientation:** the job will be rendered using the specified orientation, rather than using the one specified in the *Rotate* entry of the Page object.

Note that the following order is observed when performing the different sizing tasks: *Size* →







Overwrite orientation → Scaling → Enlarge page by → Erase border. That is, scaling applies on the already rotated page, etc.

### 6.1.6 Dispro task

The dispro task controls the pre-distortion of the job, necessary in flexography, correcting the mechanical distortions of engines, etc. Turning off this task will cause no pre-distortion. Turning it on, the following options are available:

- **Horizontal:** acts in fast scan direction (horizontally in the screen preview);
- **Vertical:** acts in slow scan direction (vertically in the screen preview).
- **Swap values:** swaps the horizontal and vertical distortion values if the defined condition is true: the job is portrait, landscape (useful for flexography) or rotated automatically (useful for correcting the mechanical distortions of the engine).
- **Flexography buttons:** bring up a distortion calculator for flexography which makes dispro calculations easier.

### 6.1.7 Separations task

Controls the process of color separations with the following options:

- **Separation profile** specifies which ICC/ICM file to use when RGB, Lab or spot colors are converted to CMYK.

*Note: manage the separation profiles in the Color profiles window.*

**This separation profile will be used as the target (simulated) ICC profile for contone proofing, as well as for the on-screen preview.**

- **Rendering intent** specifies the color conversion strategy, using the four standard values: Absolute Colorimetric, Saturation, Relative Colorimetric, Perceptual. Absolute colorimetric is only recommended for proofing, as it takes in account the paper color too. The other three settings have influence only on the colors outside of the gamut or close to it (i.e. the colors that cannot be accurately reproduced by the given colorants and printing technology), but most of the colors of an average document will not be affected by them. For generic use *Relative colorimetric* is recommended.

**CMYK information in the PS/PDF/EPS file will not be influenced by the color management settings. The ICC/ICM file will be used only for converting RGB, Lab or spot colors to CMYK, or for contone/halftone proofing.**

- **Black point compensation:** when the target device is unable to print a dark enough black, the color management module has the choice to either go either for color accuracy (such as

relative colorimetric does – in which case the details in dark shades will be lost), or for detail accuracy (such as the perceptual does – in which case colors will be shifted). As generally users prefer to not lose details in dark shades, the perceptual rendering intent would be their choice – however, this changes the colors as well. Black point compensation provides a compromise: it will preserve dark shade details, while in the meantime will avoid color changes (basically concentrating the color space distortion to the gray axis, rather than to the entire color space).

- **Disable color management:** many Windows applications are unable to handle CMYK colors (such as the popular text editor, Microsoft Word), printing black text as RGB, which then are converted to a color that contains all four process components – instead of the expected pure K. This situation can be addressed by turning off color management for certain types of objects (typically for texts): these object types then will be converted by a trivial formula from RGB to CMYK, pure RGB colors (such as black, red or green) always transforming into pure CMYK colors – more importantly the RGB black into pure K black. The available options are:
  - *Text:* disables the color management only for text objects, but other vector graphics and images will keep going through the color management module.
  - *Text and vector graphics:* enables color management only for image objects.
  - *Text, vector graphics and images:* turns off color management completely.
- **Disable embedded CIE color spaces:** PS/PDF/EPS files can contain embedded color profiles that will control the color separation of one or more objects in the file (e.g. an RGB picture may contain an RGB profile of the digital camera that took the picture). Normally the interpreter transforms these colors into RGB or CMYK, which is then passed to the color management of StudioRIP. Disabling embedded CIE color spaces will pass these colors through unchanged, treating them as though they were RGB (for colors with 3 components) or CMYK (for colors with 4 components). Depending on the embedded color space, this can result in slight color differences (in most cases, as usually the conversion is between two color spaces of the same type, e.g. device RGB to sRGB), but also in completely wrong results (e.g. blue grass in case of color spaces of different types).
- **Ignore %%BeginICCPfile comments:** Disables the automatic loading and use of an input color space that is contained in a PostScript file as DSC comments starting with the `%%BeginICCPfile` comment. ICC profiles are sometimes embedded by applications to convey the exact input color space allowing better color fidelity. Checking this option may result in improved performance at slightly reduced color fidelity.
- **Disable TN 5044 pseudo operators:** TN 5044 pseudo operators are not a part of the official PostScript specification, however they are defined in Technical Note #5044 Color Separation Conventions for PostScript Language Programs. Having these operators enabled are required for some files from QuarkXPress, however some files from Corel 9 and Illustrator 8 will operate properly only if they are disabled.

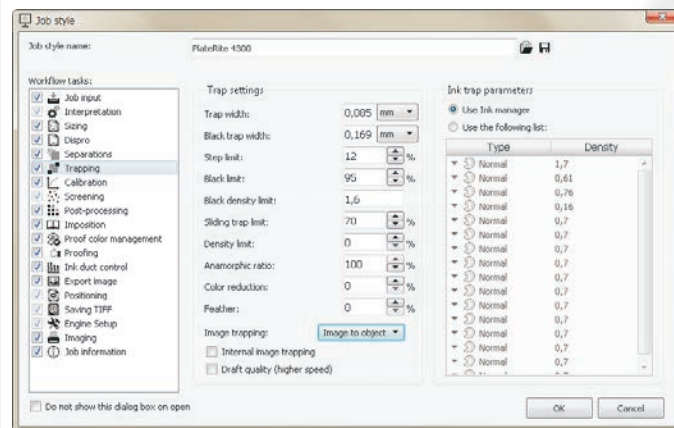


- **Convert spot colors to process colors:** if this is on, non-CMYK colors in a composite file will be automatically converted to CMYK, rather than printed as extra separations.
- **Convert to gray (K) output:** forces gray (K) output even if the job contains color (RGB, CMYK or Lab), offering the following choices:
  - *Color managed gray output:* lets the color management module to deal with the color conversion, ensuring colorimetrically correct results. The drawback of this method is that instead of preserving the K channel, CMYK colors will be converted to Lab and then to K.
  - *Keep K channel only:* the alternative to the above solution, preserving the K channel of CMYK objects.
- **Always overprint black:** overrides the overprint settings of the PostScript jobs, and ensures that any black objects will be overprinted.
- **Enable overprint:** enables overprint management for composite files (pre-separated files must have the overprint rendered during the separation process). Turning off this setting will disable overprinting in composite files, except for the black overprint.
- **Enable white overprint:** enables the overprint of white objects. In most cases white objects are set to be overprinted only by mistake (as the result is that they won't be printed), so keeping this option unchecked is recommended.
- **Nonzero overprint:** in PS versions before 3015.102 an overprinted object leaves untouched only components that the current paint operation doesn't contain (e.g. painting with a spot color did not touch the CMYK components), but knocks out all components from the current paint operation (e.g. painting with C=100, M=Y=K=0 knocks out all CMYK components), while the expected behavior would be to leave all the zero components (M, Y and K) untouched. From the point of view of the DTP application, the workaround for this was to define special color spaces (in this example, a color space containing only a cyan component). However, from the RIP point of view it is possible to define the *Force nonzero overprint* option, which will knock out only the nonzero components (in case of C=100, M=Y=K=0, knocking out only the C, as the other 3 components are zero).
  - *Default mode is 'False':* This is the compatibility behavior (the initial value of NZ Overprint parameter is 'False'), though not recommended due to the above shown issues.
  - *Default mode is 'True':* The initial value of NZ Overprint parameter is 'True' but this can be changed any time by *setoverprintmode* operator. This is the default behavior from Acrobat Distiller and 100% compatible to PS/PDF specifications.
  - *Force 'True' mode:* NZ Overprint is always true and cannot be changed. This is StudioRIP's default mode and it's significantly faster than the previous one. The only drawback is the lack of 100% compatibility, e.g. NZ Overprint is also applied on objects whose colors are derived from RGB (actually a welcomed addition for lots of scenarios).
- **Treat as registration color:** registration colors are special colors that are printed on all plates

- **All components black:** if checked, all colors with all colorants on 100% (e.g. C = M = Y = K = Pantone 123 C = 100%) will be considered registration colors.
- **Process components black, others white:** if checked, all colors with all process colorants on 100% and all other colorants on 0% (e.g. C = M = Y = K = 100%, Pantone 123 C = 0%) will be considered registration colors.

In high-quality reproduction of color documents, the gaps caused by the misregistration of the press are commonly avoided by creating an overlap, called a trap, between areas of adjacent color. The trapping parameters defined by the Level 3 revision of PostScript, as well as StudioRIP's proprietary parameters, are below:

- **Trap width:** the width of the traps for regular colors; see the exceptions below.
- **Black trap width:** the width of the trap when one of the adjacent colors is considered to be black (see definition of black below).
- **Step limit:** has an influence on deciding whether two adjacent colors need trapping or not. Increasing this number will cause certain colors not to be trapped.
- **Black limit:** specifies whether a tint can be considered black (and therefore trapped as black), assuming that its ink is dark enough to be considered black (see below). Typically tints over 95% are considered black.
- **Black density limit:** if an ink has a neutral density above the value specified here, it will be considered black. Normally only very dark inks have to be considered black.
- **Sliding trap limit:** specifies when the trap will start to be shared between two adjacent colors: if the ratio between the neutral densities of the two colors is above this limit (i.e. the density of the two colors is close enough), instead of the light color trapping the dark one, they will share the trap (shifting the trap gradually instead of a jump when trapping vignettes). Increasing this value will tighten the transition area on vignette traps.
- **Density limit:** The visual impact of the trap can be minimized by reducing the density of the trap (i.e. the density of the resulting color in the trapped area) – the closer the resulting density is to the original density (i.e. the density of the original color in the trapped area), the smallest the visual impact will be. Setting a non-zero value as the density limit, the density of the trap will be limited to the density of the original color increased by the value specified here (e.g. if the value specified is 70% and the density of the original color is 0.5, then



the maximum density of the trap will be  $0.5 \times 1.7 = 0.85$ ). If the density of the trap will exceed the specified value, the components of the trap colors will be proportionally reduced to match the maximum density.

- **Anamorphic ratio:** the misregistration in the X and Y directions in the printing process might be different. StudioRIP can compensate for this by applying different trapping in the X and Y directions. This value will specify the ratio of X and Y directions, in percentages (100% will mean equal trapping in X and Y directions).
- **Color reduction:** Has a very similar behavior as the *Density limit* setting, but instead of specifying a threshold value that the resulting trap cannot exceed, it reduces the density proportionally with the original color, adjusting the trap color reduction with a continuous setting, from no reduction (0%) to full reduction, matching the original density (100%).
- **Image trapping:** Controls the trap between bitmaps and vector objects, offering the following options:
  - **Disabled:** there will be no trapping between images and vectors;
  - **Image to object:** the trap will be created according to the bitmap color in the given area (e.g. yellow parts of a bitmap will be spread under cyan vectors, but black parts of the bitmap will be choked by cyan vectors). Note that this option will considerably slow down processing, although still working on decent speed.
  - **Spread:** the image will be spread to the vectors;
  - **Choke:** the image will be choked by the vectors;
  - **Centerline:** the image and vectors will share the trap.
- **Internal image trapping:** Enables trapping between the image elements (e.g. a yellow part of the bitmap will spread under the cyan part of the bitmap). Note that trap scenarios are unlikely in real-life photos due to the natural blur that can be observed by pictures taken by cameras, so this option only makes sense for vector objects converted into bitmap by DTP applications. Therefore this option is recommended to be used only in very special situations, especially taking in account that it is extremely slow as well.
- **Draft quality:** will increase the speed of trapping by doing the trapping between two objects with disregard to the presence of a third color (object) or the white background, while normally, at the expense of a lower speed, StudioRIP will adjust the trap shape to minimize the risks of trapping artifacts.
- **Use ink manager:** the ink definitions in StudioRIP hold the trapping parameters of each (density, opacity etc.). Checking this option, the trapping module will extract the parameters of the inks from the ink manager.
- **Use the following list:** allows the user to override the ink definitions in the ink manager for a specific job by defining the ink parameters for each ink, in the order they will appear in the *Separations* list of the job browser.

### 6.1.9 Calibration task

The calibration task applies the various curves (device linearization, transfer, desired and actual dot gain curves). If turned off, no calibration will be applied over the job. An unlimited number of curves can be applied. The curves will be applied in their listed order. For further information about calibration curves, particularly the meanings of the various curve types, see [6.3.4 Calibration curve editor \(page 96\)](#).

The following buttons are available on the right side of the list:

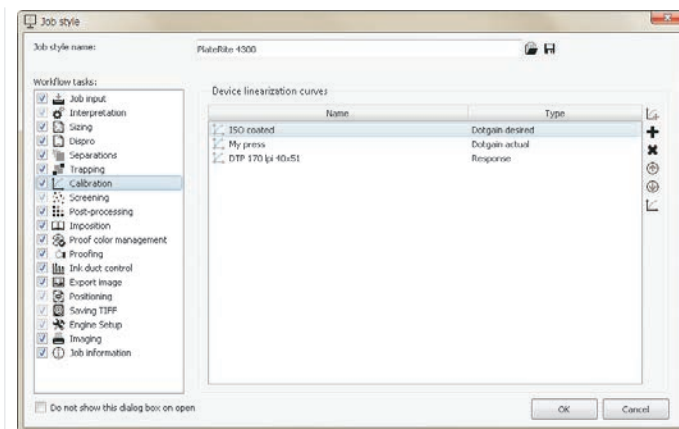
- **Create and add:** creates a new curve by launching the curve editor (see [6.3.4 Calibration curve editor \(page 96\)](#)), and adds it to the top of the list (see the reasons below).
- **Add existing curve:** adds an existing curve to the top of the list (see the reasons below).
- **Remove curve:** removes the selected curve from the list of applied curves, without erasing the curve itself from the StudioRIP system.
- **Move up/down:** change the position of the curve in the list, in order to change the order in which the curve will be applied (the topmost curve will be applied first).
- **Edit curve:** edits the currently selected curve (see [6.3.4 Calibration curve editor \(page 96\)](#)).

Although for most usual curves (compensating for small dot gains) the order in which they are applied has little effect, it is highly recommended to apply them correctly in order to have accurate results.

**The correct order of the curves: Desired dot gain, Actual dot gain, Linearization. In case of iterated fine tunings of dot gain compensation and/or linearization, the correct order is: Desired #N, Actual #N, ..., Desired #1, Actual #1, Linearization #M, ..., Linearization #1, where N is the number of dot gain compensation iterations, M is the number of linearization iterations.**

The following rules are recommended to be taken in account regarding multiple curves:

- **Recalibrating devices:** as an alternative to the regular linearization method of a device (i.e. printing an *uncalibrated* page and then *replacing* the existing linearization curve), the linearization of an already linearized device can be fine tuned by performing the linearization procedure with *calibrated* test page, and *adding* the resulting curve *before* the current curve(s). This method can be iterated several times, new curves being always added *before* the existing ones (although a large number of chained curves isn't recommended due to speed and stability issues).
- **Dot gain compensation:** the recommended way for dot gain compensation is to define the *desired* and *actual* dot gain curves – note that this order is important, the *desired* curve first transforms the incoming PS/PDF percent into the desired percent (e.g. 50% into 68%), then the *actual* curve finds the right printed percentage that produces the desired measured percentage (e.g. 45% being known as printing the desired 68%). This can be done either by the





6.4.5 *Dot gain compensation wizard* (page 101) (that creates the desired and actual curves based on spectrophotometer measurements), or by entering the desired curve from a library, and creating the actual curve using a densitometer. Similarly to the linearization, the dot gain compensation can also be fine tuned by iterating the procedure, in which case the new desired-actual curve pairs need to be placed *before* the previous curves.

If linearization and dot gain compensation curves are used together, first do the dot gain compensation, and then the linearization. The general rule is that the order in which the operations are performed (e.g. exposing the plates and then printing on paper) should be reverted in the list of curves: put on the top of the list the curve that controls the last operation (e.g. the dot gain compensation curves that compensates for the dot gain of the press), and put on the bottom of the list the curve that controls the first operation (e.g. the linearization curve of the CTP). The same rule applies for the order of recalibrations: new curves are always placed *before* the old ones.

To understand the logic behind the counterintuitive rule of inverted order, let's consider the following example: the dot gain compensation curves require the 50% tint to be printed as 45% in order to have the desired 68% on the paper (concretely: we must measure 45% on the plate in order to measure 68% on the paper that is expected for an incoming 50% tint), while the linearization curve of the CTP tells us that the CTP prints 40% as 45% (concretely: we must have 40% in the 1-bit TIFF file in order to measure 45% on the plate).

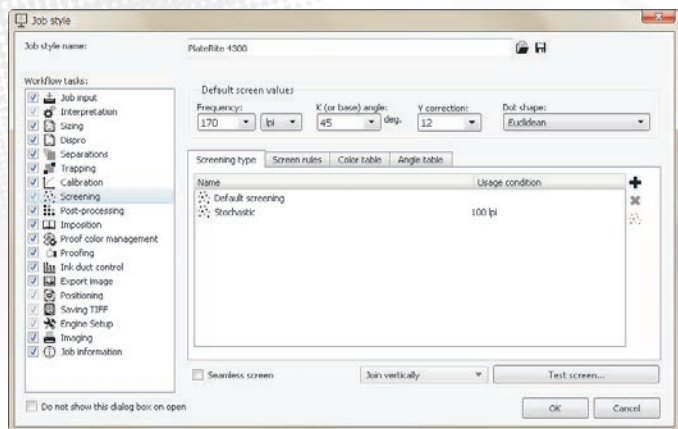
From the point of view of the PS/PDF interpreter, we first need to apply the dot gain compensation: assuming that we have a properly linearized plate, we first transform the incoming 50% tint of the PS/PDF file into 45%, knowing that the subsequent processing will ensure that this 45% will indeed appear on the plate. Then this 45% is passed to the plate linearization curve, which will transform this 45% into 40%, knowing that a printed 40% measures as 45% on the plate.

So the order of applying the curves was 50% → 45% → 40%, i.e. first the dot gain compensation (controlling the last operation: the printing), and only then the linearization curve (controlling the first operation: the plate exposure) was applied.

### 6.1.10 Screening task

The screening task is done for all jobs that are not composite (and naturally turned off for composite job styles). The following options are available:

- **Frequency:** the default screen frequency, in lpi (lines per inch). Can be (and, by default, will be) used by the *Screening type settings* dialog.
- **K (or base) angle:** the default angle, in degrees. It is the base angle for building the angle set. In the case of angles being assigned by color name (e.g. typical color PDF files), this will normally be the angle of the black. Other angles of the angle set will be derived from the base angle, typically the cyan will be -30 degrees from the base angle, and magenta +30 degrees.



- **Y correction:** the correction ratio, in percentages, of the yellow screen frequency, in order to decrease yellow moiré (see more about yellow moiré in section 9.2.3 *The moiré between the yellow and other inks* (page 147)). The default value is +12%, meaning that the yellow screen frequency is increased by 12% from the default screen frequency (e.g. in the case of the default screen frequency being set to 175 lpi screen, the yellow screen frequency will be around  $175 + 12\% = 196$  lpi).
- **Dot shape:** the default dot shape. Can be (and, by default, will be) used by the *Screening type settings* dialog.
- **Screening type:** one or more screening types can be defined in a job style: there will be a default screening type, and there may be one or more screening types triggered either by their angle or screen frequency values defined as *Usage condition*. If the angle or screen frequency of a given object in the PS/PDF/EPS file matches this value, the matching screening type will be used; otherwise the default screening type will be used. It is possible to assign a special screen frequency to certain objects in the job in most DTP applications, so using this feature it is possible to use different screening types for certain objects on the page (e.g. a given bitmap printed with stochastic screening, the rest of the page with AM screening).
  - The *Add screening type* button will add a new screening type item.
  - The *Delete screening type* button will remove the selected screening type item, unless it is the default one.
  - The *Screening type settings* button will display the *Screening type settings* dialog. See more in 9.7 *Screening type settings* (page 158).
- **Screen rules:**
  - *Override frequency:* the frequency specified in the job will be ignored, using the frequency defined in StudioRIP instead.
  - *Override dot shape:* the dot shape specified in the job will be ignored, using the dot shape defined in StudioRIP instead.
  - *Snap angle to multiple of 7.5°:* makes sure that all angles in the job will be a multiple of 7.5° (all common screen sets, including offset, flexo or silk printing, are all using angles that are multiple of 7.5°). For example, old Level 1 PPDs often defined slightly deviated angles to reduce moiré (as the RIPs were unable to achieve accurate screen angles), which obviously are wrong values for modern RIPs and need to be corrected.
  - *Snap to angle set built on K (or base) angle:* makes sure that all angles in the job will be in the screen set suitable for the given technology (e.g. based on 45° for offset, based on 37.5° for flexo, etc.). For example, it can automatically transform the angles of a job with offset angles into flexo angles.
  - *Skin tone protection (place Y angle between C and K):* places the yellow angle (or the angle of any color coming on the standard angle of yellow – 0° in offset terms) between the C and K angles (30° in offset terms). The result will be eliminated M + Y moiré (orange,



skin tones), no change for the C + Y moiré, and an increased K + Y moiré (visible only for high black generation).

- *Override colors of separations according to the color table*: ignores the colors declared in the PS/PDF/EPS file, and will replace them, in the order they will be shown under the *Separations* item of the job browser, with the items of the *Color table* tab of this dialog. For example, if the color information has been lost for a pre-separated CMYK job, checking this option (and using the default CMYK colors of the *Color table*) will apply (cyclically, if needed) the process colors to the plates of the job.
  - *Override angles of separations using the angle table*: ignores the angles defined in the job, and looks up the angle of the given color in the *Angle table*. It is possible to use color names like *Unidentified color #N*, which will be assigned to the N<sup>th</sup> color of the job that didn't have a matching color name.
  - *Guess unspecified separation colors by angle according to angle table*: if the angle of a plate is defined in a pre-separated job, but its name isn't, StudioRIP will assign a color to the plate by looking up the color of the given angle in the *Angle table*.
- **Color table**: see the *Override colors of separations according to the color table* option above. Colors can be added and removed using the buttons on the right of the table, and the color can be changed by clicking on the color icon or its arrow.
  - **Angle table**: assigns angles to color names, used by the *Override angles of separations using the angle table* and *Guess unspecified separation colors by angle according to angle table* options above. Colors can be added and removed using the buttons in the right of the table; the color can be changed by clicking on the color icon or its arrow; the angle can be changed by clicking on the angle text of a selected item, then typing into the editor that appears in about one second (note that two clicks are necessary to edit the angle of an item that is not selected). The angle values will be automatically updated if the *K (or base) angle* field is changed.
  - **Seamless screen**: ensures that the left and the right and/or the top and the bottom edges of the job will not produce broken halftones on joining. The most important use of this feature is to produce flexo sleeves that can print continuous, infinite images (e.g. wallpapers), but it can be useful for imposition as well.

Turning on the Seamless screening option will slightly change the size of the job (up to a few millimeters for the 150–175 lpi range) in the given direction (e.g. the Join vertically option will change the job height). The quality of the yellow screen may also become worse.

- **Test screen**: displays the *Test screen* window, which provides a visual interface for testing the screening system of the job style. The test is made globally for the entire job style, rather than for the selected screening type. See more about its functionality in [9.8 Test screen window](#) (page 163).

### 6.1.11 Post-processing task

Can perform the following pixel-wise operations on the rasterized image data:

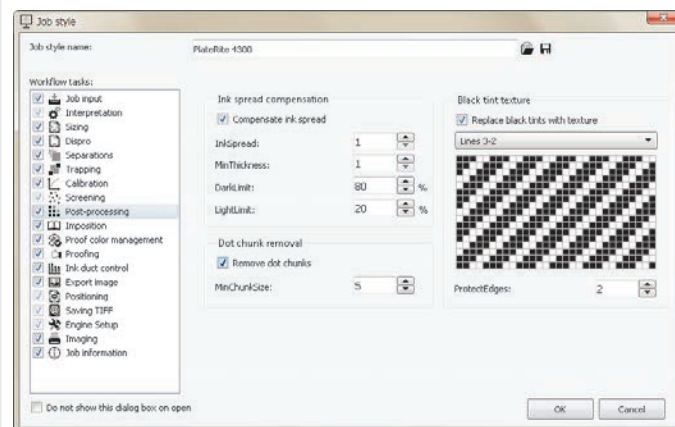
- **Ink spread compensation:** makes vector objects thinner (or in negative imaging, thicker) in order to compensate the ink spread that occurs during the imaging and/or printing process. Note that while the dot gain compensation and ink spread compensation are two very different strategies that compensate the effects of the same phenomenon: the dot gain compensation applies curves on the halftones to reach the right color, while the ink spread compensation changes the shapes of vectors to reach the right line thickness.

- **Ink spread:** the thickness of removed (or in negative printing: added) area on the vector object edges, in device pixels.
- **Minimum thickness:** the thickness, in device pixels, that a thin line will not be allowed to fall under. For example, a thin line of 5 pixels would become of 1 pixel with an ink spread of 2 pixels ( $5 - 2 - 2 = 1$ ), but having a minimum thickness of 3 pixels is specified, only  $1 + 1$  pixels would be removed from it, protecting the thin lines from becoming dangerously thin.
- **Compensate shades above:** the halftone percentage above which a color is considered dark (and therefore subject to ink spread compensation). Multi-channel colors must have at least one channel reaching the limit to be considered dark.
- **Touching light area below:** the halftone percentage below which a color is considered light (and therefore triggering ink spread compensation if it touches a dark object). Multi-channel colors must have all channels below the limit to be considered a light.

- **Dot chunk removal:** the halftoning process often results in chunks of screen dots. For example a sharp text rendered with a 20% halftone pattern will have screen dots falling on the edges of the characters, in which case only a part of the screen dot will be kept. In unfortunate situations only a very small chunk of a few pixels will remain – a troublesome issue for certain printing technologies, typically flexography: the thin and weak ‘thorns’ resulting from these small chunks will be very unstable – may break, bend, overink etc. Flexographers usually want to get rid of these chunks – this is what the *Dot chunk removal* option does.

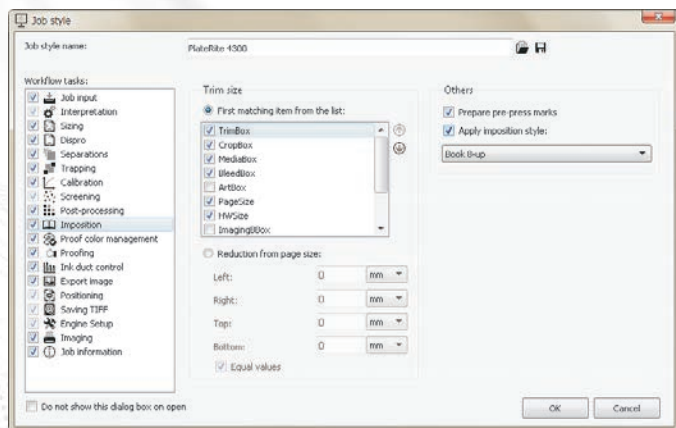
- **Minimum chunk size:** defines minimum the size, in device pixels, of a contiguous area of pixels that is not removed from the final output. For example, if 5 pixels is specified, than any contiguous area consisting in 4 pixels of less will be removed.

- **Black tisk texture:** many printing technologies have difficulties printing 100% tints. It has been observed that 99% tints print reacher and more uniform blacks though, the physical explanation of the phenomenon being that the ‘rough’ surface of the 99% tint can hold more ink. This lead to the idea of creating specially designed patterns that have the optimal



ink holding properties. StudioRIP offers a variety of patterns to be used as replacements of 100% tints.

- **Replace 100% tints with texture:** specifies the pattern to replace 100% tints with.
- **Protect edges:** the size, in device pixels, of the edge that will be protected (that is, these areas will be left untouched). This feature is important in order to keep the edges of halftone dots sharp (as well as to avoid potential moiré), but it also protects sharpness of small vector graphic.



### 6.1.12 Imposition task

Checking the imposition task is necessary for any of the following:

- to prepare pre-press marks,
- to extract the trim size of the job,
- to apply imposition styles automatically.

The following options are available:

- **Trim size:** defines the trim size (i.e. the final size of the product, without bleed and pre-press marks) of the job. With the imposition task turned on, this will become the displayed and printed size of the job, while the size defined in the *Sizing* task will become the bleed size. See more in [8.6 Bleed, page 137](#).

**Turning on imposition may change the displayed and printed size of the job, although the processed size remains the same and available as bleed.**

- **First matching item from the list:** will extract the trim size of the file from the various size declarations of the PostScript, PDF and EPS files. As their use by the various DTP and pre-press applications isn't very consistent, StudioRIP allows the user to fine tune the size extraction procedure to get the best possible result with the used applications. StudioRIP will search for the first definition in the list that is ticked and also present in the PS/PDF/EPS file. The user can change the order of the size definitions, and can check or uncheck them. By default, the *TrimBox* definition is the most desirable one (first in the list and checked), but if it is not present in the file, StudioRIP will search for the *MediaBox*, *CropBox* etc. definitions.
- **Reduction from page size:** the trim size will be computed from the page size defined in the *Sizing* task and reduced by a certain amount. For example, a PostScript file may be generated 5 mm larger than the actual trim size, and then reduced by 5 mm with these controls. The result will be a bleed of 5 mm.
- **Prepare pre-press marks** option will control whether the RIP will process the pre-press marks for the given job style in order to allow the use of pre-press marks with the jobs pro-

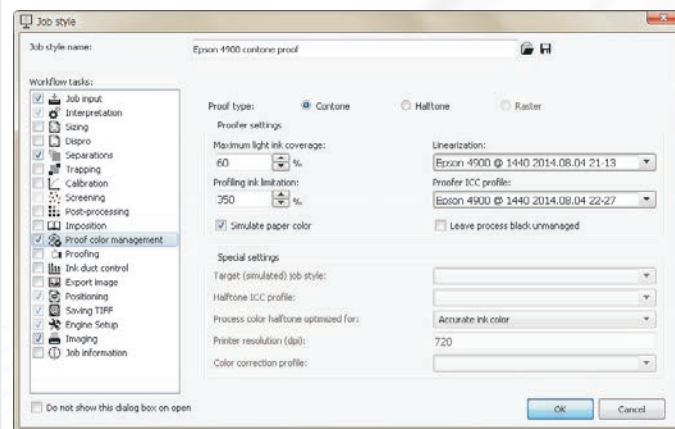
cessed with this job style. It is a time consuming task only for the first time, then the caching system will detect that the marks are already processed, so uncheck this only if preprocess marks are never used, or job styles are often changed.

- **Apply style** option will apply a pre-defined imposition style (see chapter 8 on page 127) to the job automatically, and is particularly useful if the same imposition style is used often. It also means that, if, for example, a color catalog with 128 pages is imposed with a colate and cut imposition scheme, with 8 pages on each side of a sheet, the imposition scheme can be (1) defined before processing the catalog, (2) saved as an imposition style and (3) selected here in the *Apply* style list. When processing the job, the imposition style will be applied automatically. The benefit will be that after the first 16 pages are processed, the first two sheets will be imposed and ready to image immediately, without waiting for the rest of the pages to be processed.

### 6.1.13 Proof color management task

This task performs the color management for proofs. These settings are normally created by the various proof wizards, changing them manually is only recommended for experts. Note that this task may hold relevant settings even for non-proof job styles, the various proof wizards store their partial results in this section of the original job style before creating the proof job styles. The following options are available:

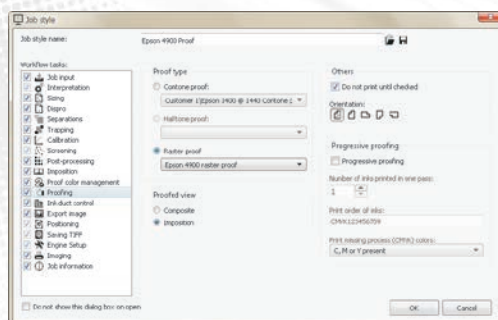
- **Proof type:** specifies whether the proof type is contone, halftone and raster. If the *Contone* setting of the interpretation task is turned off, only raster proof type is allowed, otherwise only contone and halftone proof types are allowed.
- **Maximum light ink coverage:** specifies the maximum permitted coverage (density) of a light ink (e.g. light cyan, typically used by inkjet printers). Increasing this value to 100% will improve quality, but may cause ink flow problems (as the paper may not support too much ink). The default value of 70% will, on most inkjet printers, avoid ink flow problems.
- **Profiling ink limitation:** filled in by the *Proofer linearization wizard* (or otherwise defaulted to 300%), this is the value that the *Contone* and *Halftone proof wizards* will use to default the *Ink limit* field (used to limit the ink quantity on the paper). Has no effect on jobs printed with the job style, and it is also different from the physical ink limit determined by the proof linearization wizard (this one takes in account the light inks and the linearization curves too).
- **Linearization:** holds the linearization information of a proofer device at a specific resolution and with a specific paper. A linearization profile can be created by running the *Proofer linearization wizard*. A linearization file will be necessary to run the *Raster*, *Halftone* or *Contone proof wizards*, and will be copied to the resulting job styles.
- **Proofer ICC profile:** the ICC profile of the proofer in contone mode. It is created by the *Contone proof wizard*, and for accurate spot color reproduction it is recommended that it is created before running the *Raster proof wizard*. It must be created before running the *Halftone proof wizard*.





As StudioRIP has its own rasterization, linearization and ink management modules, it doesn't make any sense to use ICC profiles created by other applications as proofer ICC profile (the result will certainly be inaccurate).

- **Simulate paper color:** specifies whether the proof should simulate the color of the target paper (typically printing a yellowish tint on the bright white proofing paper in order to match the color of the offset paper). Unchecking this option is not a correct procedure, as the proof will still remain absolute (possibly resulting in visible white spots in light areas – the light colors will still have the paper color counted in), but many users prefer it.
- **Leave process black unmanaged:** prints the  $K = 100$ ,  $C = M = Y = 0$  colors with the full black colorant of the proofer device, resulting in less accurate but sharper black. This can improve the sharpness of small text or line art elements.
- **Target (simulated) job style:** specifies the job style that a halftone proof simulates. It is set up by the *Halftone proof wizard*, changing it may affect proofing accuracy.
- **Halftone ICC profile:** specifies the ICC profile of the proofer in halftone mode for the given target job style. It is set up by the *Halftone proof wizard*, and if the screen settings of the target job style are changed, it is recommended that the *Halftone proof wizard* is rerun, creating a new halftone ICC profile.
- **Process color halftone optimized for:** specifies the sharpness and color accuracy of halftone dots. It is set up by the *Halftone proof wizard*, changing it may affect proofing accuracy. For details, see [10.2.4 Halftone proof wizard \(page 175\)](#).
- **Printer resolution:** the real resolution of the proof printer for raster proof job styles. Note that the resolution specified in the *Interpretation* task is the resolution of the target device (i.e. imagesetter or CTP) rather than of the real proofer device (i.e. inkjet printer).
- **Color correction profile:** holds the profiling information for a specific combination of target device, proofer device, screen and calibration settings. It can be created by running the *Raster proof wizard*.



### 6.1.14 Proofing task

This task needs to be used if the job is processed normally (e.g. for a CTP or imagesetter), but a proof needs to be printed too.

Do not check this task if the only purpose of the job style is to print a proof, otherwise the proof will be printed twice (as the proof of the proof).

The following controls are available:

- **Proof type:** Raster, halftone and contone proofs can be chosen, assuming that there are

proof job styles of the appropriate type defined in the system. Choose the required proof type and job style.

**The proofing task will be disabled if there are no available proof job styles in the system.**

#### Proofed view:

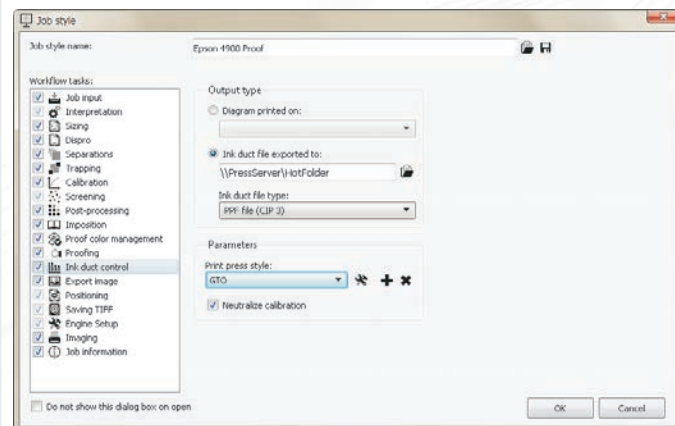
- **Composite:** the composite view of the job will be proofed, as shown in the *Composite* pre-view window.
- **Imposition:** the imposition view of the job will be proofed, as shown in the *Imposition* pre-view window (containing pre-press marks, and eventually several pages per sheet).
- **Do not print until checked:** the proof job will stay in the job browser, waiting for confirmation, until it is checked.
- **Orientation:** the orientation of the proof job, as printed on the proofer.
- **Progressive proofing:** simulates the printing passes progressively. See [5.4.3 Proofing page 57](#).

#### 6.1.15 Ink duct control task

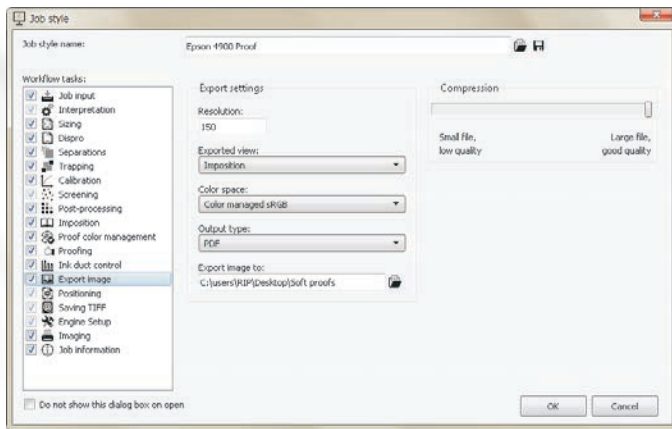
Calculates the ink coverage for each ink zone of the page, belonging to each ink duct of the offset machine, and prints a diagram or exports a JDF (CIP 4), PPF (CIP 3), BMP or JPEG file. The following options are available:

#### ■ Output type:

- **Diagram printed on:** prints an ink zone diagram on the specified Windows printer (typically a small office printer).
- **Ink duct file exported to:** exports a PPF, JDF, BMP or JPEG file to the specified folder.
- **Ink duct file type:** the type of the exported file: PPF (CIP 3), JDF (CIP 4), BMP (grayscale Windows bitmap) or JPEG (grayscale JPEG bitmap).
- **Press profile:** the parameters of the print press (cylinder size, number of ink ducts, positioning, etc.). Print press styles can be edited, added or removed with the buttons in the right of the combo box. See [5.4.2 Ink duct control page 56](#) for further details about defining a print press style.
- **Neutralize calibration:** neutralizes the effect of the linearization curve, so that the ink duct control information will reflect the real image on the film or plate rather than the calibrated bitmap before exposure.







### 6.1.16 Export image task

Exports the PDF, JPEG or BMP preview of the job to a specified folder. The following options are available:

- **Resolution:** the resolution of the generated picture, defaulted to 150 dpi. Higher resolutions are possible, but are not recommended for several reasons (long processing time, large JPEG file and possible moiré problems). Use PDF for high resolutions (which uses a banding technique to generate the image), otherwise the RIP may fail with out of memory error.
- **Exported view:** specifies whether the composite or imposition view of the job will be exported.
- **Color space:**
  - *Color managed sRGB:* recommended for color or content proofing. The job will be converted into the standardized sRGB color space, which will be displayed in the same way on calibrated monitors. In this mode the files will be well compressed, suitable for being sent over the Internet.
  - *CMYK or N-color (PDF only):* recommended only if the separations need to be accessed separately. The separations of the job will be stored unchanged, so the displayed colors will depend on the CMYK working space setting of the PDF viewer application. The file size will be significantly bigger in this mode.
- **Output type:** specifies whether a PDF or JPEG/BMP (Color managed sRGB only) file will be exported.
- **Compression:** the quality of the JPEG compression, as a compromise between quality and file size.
- **Export image to:** the path the PDF, JPEG or BMP files will be exported to.

### 6.1.17 Positioning task

This task controls the positioning of the image data on the media. The following options are available:

- **Sheet/plate type:** contains a list of predefined page sizes. Choosing a predefined page size will fill the width and length fields automatically.
- **Transverse:** used in conjunction with sheet/plate type, swaps the width and height of the selected sheet/plate.
- **Width:** the width of the media used with the current profile, perpendicular to the feed direction. In case of roll fed media, this will be the width of the roll.
- **Length:** the length of the media used with the current profile, in feed direction:
  - for a sheet fed machine, set the height of the sheet/plate;

- for a roll fed machine with limited image length (e.g. drum imagesetter), set the size limit (e.g. the drum size);
- for roll fed machine with unlimited image length (e.g. capstan imagesetter), set zero;

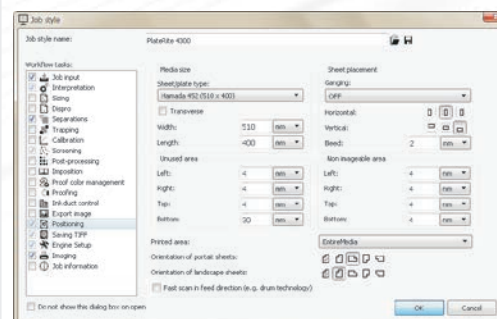
■ **Ganging (a.k.a. Media saving):** StudioRIP can collect consecutive pages on the media width, to save media (e.g. an A2 imagesetter can print two A4 plates on the media width, so two consecutive A4 pages can be collected and printed together).

The available ganging strategies are:

- **OFF:** turns ganging off (mandatory for CTP devices);
- **Collect pages to media width:** collects plates in rows that fill the media width, printing each row as one job. For example if 4 plates fit on the media width, then a job of 8 pages will be printed as 2 jobs (i.e. two TIFF files will be sent to the TIFF catcher, each TIFF containing 4 plates).
- **Collect pages to entire media:** fills the available media size with plates, from left to right and from top to bottom, saving one TIFF file per media.

Many drum machines have geometrical distortions. Using this feature on these machines will cause separation pages to have registration errors. It may be advisable to print more slowly but more precisely by turning this feature off.

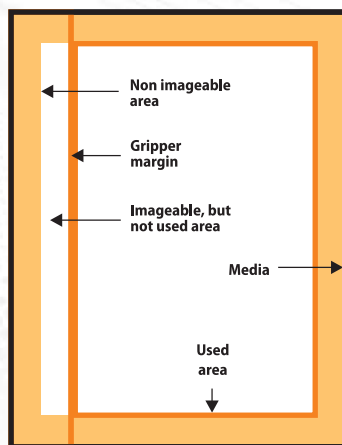
- **Horizontal and vertical alignment:** specifies the alignment of the job on the media horizontally (left, center, right) and vertically (top, center, bottom). Changing this value will set the *Printed area* option of the *Imaging* task to *Entire media*.
- **Bleed:** specifies the amount of image around the sheet that may exceed the sheet size. It is recommended to keep a few millimeters of bleed, for example the the guide mark couldn't work properly without this (as it must exceed the sheet size in order to be printed on the sheet edge).
- **Unused area:** specifies the area, measured from the *edge of the media* (rather than from the imageable area), which for various reasons is not intended to be printed on (irrespective of imageable or not). The grip margin is a typical example of this. Setting a non-zero value will set the *Printed area* option of the *Imaging* task to *Entire media*.
- **Non-imageable area:** specifies the area, measured from the edge of the media, which cannot be imaged by the print engine. An exception is the case of the roll fed machines, where *Left* and *Right* specify the non imageable margins, but *Top* and *Bottom* act as inter-page gaps. Setting a non-zero value will set the *Printed area* option of the *Imaging* task to *Entire media*.
- **Orientation of portrait/landscape sheets:** specifies the orientation of the sheet on the media, depending on its original orientation. Although roll fed machines can left on automatic, typical CTP setups will specify the exact orientations for portrait and landscape to keep the positions of the marks in the needed position relative to the gripper edge. The automatic setting finds the orientation that fits on the media. If the job fits the media in both orienta-



tions, chooses the one that is more economical. Note that for single pages it may seem that it chooses the wrong orientation, but the RIP assumes that usually there will be more than one page of the same size to be collected on the width of the media (otherwise registration problems could occur if, when reprinting a color, it has a different orientation than the other plates).

- **Fast scan in feed direction:** on drum engines the job width is, confusingly, measured along the media axis (i.e. the jobs are 90° rotated from their normal position), so this option needs to be checked in order to have the automatic rotation, media saving and media count functionalities working properly.
  - Check this option for roll-fed drum devices or other devices where the width of the job is measured along the media length axis.
  - Leave it unchecked for capstan machines or inkjet printers.
  - To avoid further confusion, we recommend leaving it unchecked for sheet fed drum devices (e.g. CTP machines), and just swap the plage width and height instead for proper functionality.

**The margin and alignment settings will be effective on the output only if the *Printed area* option of the *Imaging* task is set to *Entire media*, otherwise they will only modify the preview.**



To understand this, an explanation of how StudioRIP places the image on the print area is necessary. Some print engines provide limited or no control for positioning the image on the media, therefore StudioRIP offers a simple but effective way to control the position of the image: imaging the maximum imageable area, placing the image on this area according to the settings, and leaving the areas outside of the image unexposed (or fully exposed, in case of negative printing). However, this method has several disadvantages:

- Imaging the maximum area (including the white borders) is usually slower than imaging just the effective image. Setting up the print engine (if possible) might yield better speed.
- StudioRIP performance might also be affected by creating larger output files.
- Setting up the margins with wrong values might cause inaccurate placement or imaging errors.

Therefore, in cases when positioning isn't very important (such as printing on roll media), *Printed area* is recommended to be set to *Bounding box of contents*. On CTP machines, which need accurate placement of the image on the plate, there are two scenarios:

- the TIFF catcher of the CTP will be used for positioning the image: usually this is the fastest solution, so if there are no technical difficulties with it, this is the recommended setting. In

this case *Printed area* will be set to *Bounding box of contents*, but the margin and alignment controls can be still used for an accurate preview of how the CTP will do the placement.

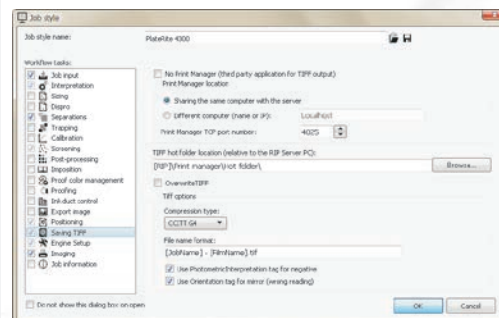
- the TIFF catcher is not used for positioning the image (typically because it has no interface for positioning, or there are technical difficulties with it): in this case StudioRIP's interface will be used for positioning, and *Printed area* is set to *Entire media*.

In the second scenario, it is critical that the margin values are used. Pay special attention to fill in the right values.

### 6.1.18 Saving TIFF task

Controls the way the TIFF is output to the hot folder of the TIFF catcher software, and optionally the Print manager connection settings. The following options are available:

- **No Print manager:** tick this option if no Print manager will be used; in this case, the Print manager location box will be grayed out.
- **Print manager location:** controls how the Server connects to the Print manager (if it does);
  - choose *Sharing the same computer with the Server* option if the Print manager and the Server are on the same PC, and therefore no IP address is needed;
  - specify the host name or IP address of the computer running the Print manager to connect to if the Print manager and the Server are on different PCs;
  - specify the TCP port number the Print manager is listening on for incoming connections;
- **TIFF hot folder location:** specifies the folder that the 1-bit TIFF files will be dropped into. When using third party TIFF catcher software without the use of the Print manager (i.e. sending the TIFF files directly from the Server to the hot folder of the TIFF catcher), this is the place to specify as the location of the TIFF catcher's hot folder. Note that this path is relative to the Server PC's file structure.
- **Overwrite TIFF:** when the Server creates the TIFF file, it checks whether a file already exists with the given name. If it does, it will either overwrite the existing file (overwrite TIFF checked), or will choose a free name by adding a number suffix to the end of the file name (overwrite TIFF unchecked).
- **Compression type:** Standard TIFF compression types can be chosen (CCITT G4, CCITT G3-1D, LZW, Packbits), a special StudioRIP compression type designed for 16-bit contone data (Packwords), as well as no compression.
- **File name format:** defines the naming convention of the output TIFF files – especially useful with third party TIFF catchers which may expect a given convention. Note that this is effective only if no Print manager is used (i.e. the TIFF files are placed into the hot folder of the TIFF catcher directly by the Server). The format string contains variable fields (such as job name, sheet name, ink name), written as the name of the field in brackets, e.g. [JobName]. The following fields are defined:



- **JobName:** the name of the job, as it appears in the job browser;
  - **JobShort:** the name of the job with any non-alphanumeric characters removed (including spaces), resulting in a name containing only letters or digits;
  - **FilmName:** the name of the piece of media that belongs to the printed TIFF, as appears under the *Media* node in the job browser.
  - **FilmShort:** same as above, but alphanumeric characters only (see also *JobShort*);
  - **FilmIndex:** the index of the output TIFF file within the job. For example, if the film saving has grouped a CMYK job into two TIFF files, one containing the cyan and magenta plates, the other the yellow and black plates, the first TIFF file will have the index 1, and second one will have the index 2.
  - **InkName:** the full name of the ink (e.g. 'Cyan' or 'Pantone 368 C');
  - **InkShort:** the short name of the ink (e.g. 'C' or 'P368C');
  - Number suffixes for text fields: each text field can have a number attached at the end, this will ensure that the resulting string will have a fixed length (longer strings will be truncated, shorter strings will be padded with spaces). Example: [JobName6] will return a job name of exactly 6 characters.
  - Number suffixes for number fields: number fields can have a number attached at the end, which will add leading zeroes if the number has less digits than specified. Example: [FilmIndex3] will return '001' for the first TIFF file.
- **Use PhotometricInterpretation tag for negative:** if negative pages are sent out, this option will specify whether StudioRIP will invert the information (resulting in a baseline TIFF containing inverted information, which can be read by all TIFF readers, guaranteed), or it will be sent out as positive data but with the *PhotometricInterpretation* tag set to negative (resulting in high speed and efficiency, but possible incompatibility, if the TIFF reader cannot handle this tag correctly).
- Possible reasons for unchecking this option:
- Use of third party TIFF catchers, which may not be compatible with this tag;
  - Only the job area (rather than the entire film/plate) needs to be inverted. Using the tag, the print engine may be instructed to work in negative mode (e.g. Agfa imagesetters), inverting the entire imaged area (e.g. film width) rather than just the job.
- **Use Orientation tag for wrong reading:** if mirrored pages are sent out, this option will specify whether the mirroring will be rendered by the StudioRIP (resulting in a baseline TIFF containing mirrored information, which can be read by all TIFF readers, guaranteed), or it will be sent out as right reading data but with the Orientation tag set to mirrored (resulting in higher speed and efficiency, but possible incompatibility, if the TIFF reader cannot handle this tag correctly). If you use third party TIFF catchers, you may want to uncheck this option.



### 6.1.19 Engine setup task

Job styles can store engine specific setup information that the Print manager can send through its drivers to the print engine. For example, a high quality job style for an Epson printer may instruct the printer to turn off the bidirectional printing, while a draft quality job style may turn it on. This can be done automatically, by storing the bidirectional setting in each job style.

The engine setup task instructs the Print manager to set up the print engine with the settings contained in the parameter/value table. The rule is that engine parameters listed and recognized in the table will be set up, all other parameters will be left unchanged.

By default a job style leaves all engine parameters unchanged. If a job style sets up a parameter (e.g. turns off the bidirectional mode), all other job styles that need a different value of this setting must set up their needed value (e.g. turning bidirectional mode back on), otherwise the print engine will act inconsistently (depending on the last used settings).

The engine setup can be modified in the following ways:

- The **Copy values** button extracts the current settings of the engine, filling in the *Engine setup* dialog, which then can be saved into the table.
- The **Edit values** button fills in the *Engine setup* dialog with the current values of the table.
- The table can be edited manually – note though that any misspelled values will be ingored.

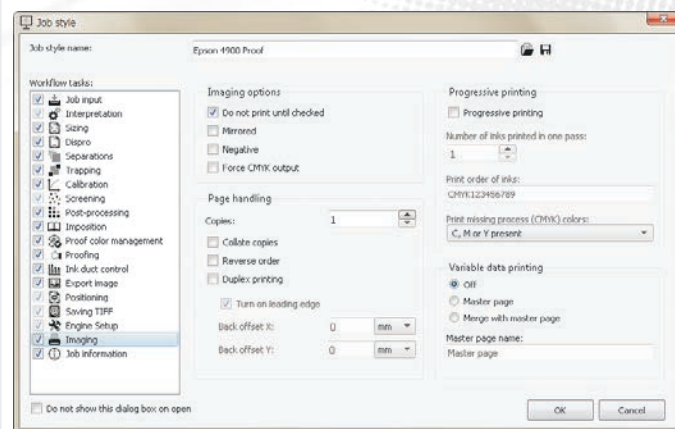
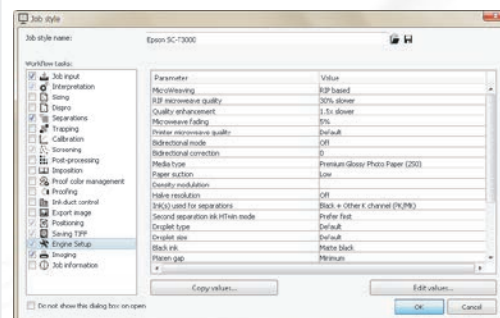
Note that when it's launched from the buttons above, the *Engine setup* dialog will appear with check boxes before each parameter. Only checked parameters will be set up, unchecked parameters will left unchanged (being removed from the table).

A frequently used print engine property is the Output path parameter of the Tiff output driver: if jobs coming through different job styles must go into different hot folders, each profile can define its own hot folder using this interface.

### 6.1.20 Imaging task

The imaging task controls the way the job will be exposed or printed on the media. The following options are available:

- **Do not print until checked:** if selected, StudioRIP will hold the job before sending it out for printing, allowing modification and verification of the job; if the option is not selected, the processed pages will be sent immediately to the Print manager or Tiff catcher;
- **Mirrored:** select if you want to print the job mirrored (i.e. wrong reading), typically for off-set printing. If you forget to select this option here, you have several further choices to turn the job into mirrored.
- **Negative:** select if you want to print the job in negative (common in flexography). Though





there are further choices for turning jobs into negatives, this is the *only* place to do it if there are calibration curves involved (otherwise the calibration curve will be applied incorrectly).

**The mirrored and negative options will show their effect only in media view! This makes previewing the job easier.**

- **Force CMYK output:** prints all process plates even if some of them are empty (or contain only pre-press marks).
- **Copies:** prints the page in multiple copies. Device drivers that have special support for multiple copy handling (such as the OKI driver) will send the page once to the device, and will pass the number of copies as a parameter.
- **Collate copies:** used in conjunction with the *Copies* field: jobs with multiple pages printed in multiple copies will be collated (e.g. printed as 1, 2, 3, 1, 2, 3 rather than 1, 1, 2, 2, 3, 3).
- **Reverse order:** will invert the order of the pages (i.e. the last page of the job will be imaged first, and the first page will be imaged last). Useful on printers that, due to mechanical reasons, reverse the page order on printing, so the right order can be achieved by checking this option.
- **Duplex printing:** will print two consecutive pages on the two sides of the same sheet of paper, if there is driver support for it (such as in the OKI driver).
- **Turn on leading edge:** the basic rule of duplexing is that portrait pages must be turned on their top edges, landscape pages on their side edges. However, most printers physically turn the page on the leading edge, which is often the wrong edge. This setting simulates the turn on the side edge rotating the back sides by 180°, so from user point of view, it will act as if the duplexing edge would be mechanically controlled.
- **Back offset X, back offset Y:** to have a perfect match of the duplexed front and back sides, the position of the back side can be fine tuned by shifting horizontally and vertically (in positive or negative direction).
- **Progressive printing:** designed for proof jobs (i.e. the ones that are either generated by jobs that have the *Proofing* task checked, or opened directly for proofing). Therefore it is the clone of the progressive printing settings in [6.1.13. Proof color management task \(page 82\)](#), see also [5.4.3. Proofing \(page 57\)](#) for more information.
- **Variable data printing:** can save processing time by merging simple multi-page foreground jobs (such as a 1000 page job, each page containing a name) with complex background jobs (such as one page with an image background and an empty box for names). To use this feature, follow the steps below:
  - Process the background job with the *Variable data printing* option set to *Master page*, and with the *Master page name* field set to a unique name identifying this variable data printing process, and send it to the Print manager. The job will not be printed, but instead will wait for the variable data pages to arrive.
  - Process the variable data job with the *Variable data printing* option set to *Merge with*

master page option, and the Master page name field matching the name set for the background page, and send it to the Print manager. The variable data pages will be printed, being merged with the background page by the Print manager in printing time.

### 6.1.21 Job information task

The job information settings are designed to carry and collect job specific information such as date, time, customer name, number of pages, ink usage, etc. The collected information can be then saved into a folder, e-mailed or printed for accounting or job management purposes.

The job information is a list of items. Each item in the list has a name (e.g. *Job name*) and a value. The values can be simple texts, but the power of the job information system is that these they can contain fields, such as:

- **Variable fields:** the same list of fields is available as for the pre-press marks (see 8.5.2 Pre-press mark properties (page 134)), including date, time, job name, plate ink area, number of pages, sheets, etc.
- **Cross-references:** references to other items in the list.
- **Formulas:** values starting with the '=' sign will be considered arithmetic expressions that will be evaluated.

Example: let's create a field that will calculate the ink needed for printing 1000 pages.

- First we will define an item called *Ink deposit volume ( $\text{cm}^3/\text{m}^2$ )*, which will specify the ink quantity, in  $\text{cm}^3$ , needed for  $1 \text{ m}^2$  of 100% tint. This is an empirical value, and depends on the ink, paper type and other parameters. Let's consider that the value of this item is 16.2.
- Then we will define another item, called *Pages printed with 1 liter of ink*, its value will be the following formula:

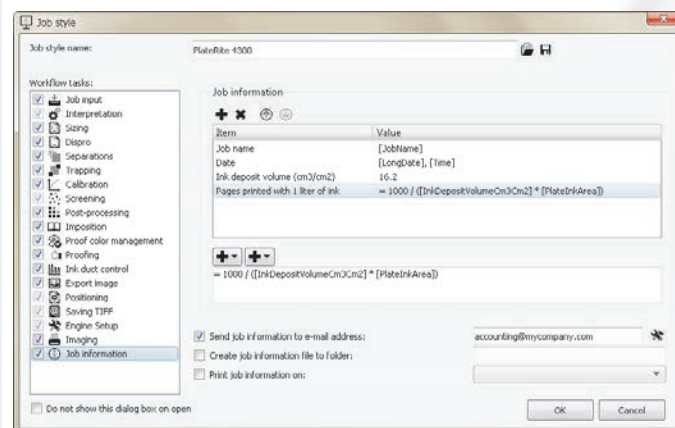
$$\text{round} ( 1000 / ( [\text{InkDepositVolumeCm}^3\text{M}^2] \times [\text{PlateInkArea}] / 10000 )$$

The formula contains a reference to the *PlateInkArea* pre-defined variable field, as well as a cross-reference to the *Ink deposit volume ( $\text{cm}^3/\text{m}^2$ )* item (the name is simplified by the insert cross-reference command).

The job information items can be added or removed by the *Add item* and *Remove item* buttons. The order of the items can be changed by the *Move up* and *Move down* buttons. The name of the item can be changed by clicking on it.

The value of the item is displayed in the second column of the list, but also in the box below the item list – this is where it can be edited too. Above this box there are two insert buttons too:

- **Insert field:** inserts a pre-defined variable field, see 8.5.2 Pre-press mark properties (page



134 for the list of available fields (the list is identical to the one available for the pre-press marks).

- **Insert cross-reference:** inserts a cross-reference to another list item. The drop-down list contains the list of the already existing items.

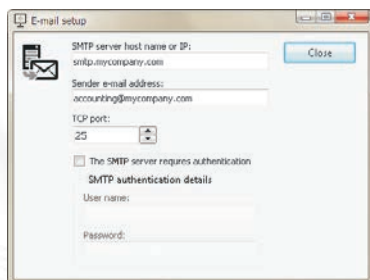
Typically the items are pre-defined in the job style (job name, number of pages, etc.). There may be other items which are defined, but the values need to be filled by the operator when opening the job (customer name, requested quantity, offered price etc.).

The result of the job information task is a text report that contains the item names and the evaluated values. The job information report will group the values into global, sheet, page and plate dependent values (e.g. the ink quantity will be displayed for each plate, but the job name will be displayed only once).

The report can be:

- Sent to the specified e-mail address,
- Saved as text file to the specified folder,
- Printed on the specified Windows printer.

The e-mail settings can be specified in the **E-mail setup** dialog that can be accessed through the button at the right side of the e-mail address field.



## 6.2 COLOR PROFILES

The *Color profiles* window manages the ICC/ICM files present in the system. Install a color profile to use for color separation by adding it here. The profiles added are automatically copied to the StudioRIP folder, with no need to keep the ICM/ICC file in its original location. If the Client is connected through the network or Internet, the file will be safely uploaded (copied) to the server through the TCP channel.

The color profiles can be added and removed by the Add and Remove buttons in the toolbar of the Color profiles window.

**The installed color profiles must be CMYK profiles. Monitor calibration or other profiles will not work, and, if used, may produce unpredictable results.**

## 6.3 CALIBRATION

### 6.3.1 Understanding calibration

Calibration allows operators to correct for inaccuracies and variations in the dot percentages that are inevitable in the various pre-press and press processes. Dot gain is a common phenomenon in many of these processes, and calibration can correct for this, as well as any inaccurate dot sizes produced by print engines or any non-linearity in the media. In essence, calibration pre-distorts the dots in the opposite direction by the right amount to compensate for equipment-caused distortions. To achieve this, the printed values are measured with a dotmeter or densitometer, and the results entered into a table. This table will be interpolated by StudioRIP, and applied to the dots.

There are various strategies to calibrate printing systems:

- **Linearization:** platesetters and filmsetters are often linearized (that is, the 50% tint is expected to be measured as 50% on the plate or film). The goal is to achieve a somewhat 'standard' output that is supposed to behave like other similarly linearized plates/films (although the various chemical, mechanical or optical parameters of the plates or films still will behave more or less differently). Well linearized plates/films are expected to print with acceptable color accuracy.
- **Dot gain compensation:** this is a more direct strategy with the goal of reaching the expected percentages on the final print. As the commercial offset CMYK became the industry standard color space in the pre-press world, generally pre-press operators expect to see offset dot gains (even if they use completely different technologies like flexography or digital printing). A dot gain compensated system using similar inks as the commercial offset will print fairly – although not perfectly – accurate colors.
- **Profiling:** this is the most accurate although the most difficult procedure: a few thousands of patches are printed and measured, then an ICC profile is built. This is generally only done for proofers (which are quick and easy to profile), and rarely done for presses (good press profiles are difficult to create due to the technology issues of offset printing). Assuming a repeatable process, profiling results in perfectly accurate colors.

The most common calibration procedure for platesetters and filmsetters is the linearization (often simply referred as *calibration*). In StudioRIP it can be done in the following way:

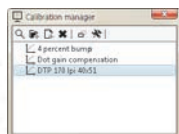
- Check whether the density of the engine (e.g. the density of a 100% tint) matches the parameters recommended by the manufacturer (try changing chemicals, adjusting the density, etc.).
- Print an uncalibrated test page (either for black only, or for all process colors).
- Add a new calibration curve, or modify an existing one.
- Measure the printed calibration page with a densitometer.

- Enter the measured results in the table of the added/modified calibration curve (e.g. 40% measured as 47.5%, etc.). In the case of all process colors, enter the black results to the *All colors* tab, then create a tab for the Cyan ink, enter the cyan results there, and so on.
- Save the calibration curve (assigning a name to it).
- Assign the calibration to the right job style.
- Optionally, print a calibrated test page to verify for accuracy, and do a fine tuning if necessary (see 6.1.0 *Calibration task* (page 76) about chained calibrations).

### 6.3.2 Print calibration page

A test calibration file is included in StudioRIP ready for immediate printing.

- Select the *Print calibration page* item of the *Calibration* menu. The *Print calibration page* window will appear.
- Select the job style that the calibration will be made for. The job style holds the printer properties and screen settings that influence the calibration curve. The last used job style is used implicitly.
- Select whether to print an un-calibrated or calibrated page:
  - The **uncalibrated** page has to be printed before the calibration process. This is the page which will be measured and entered into the table of the calibration curve.
  - The **calibrated** page should be printed after the calibration, either for verification or for fine tuning. On the calibrated page the printed and measured values have to match (e.g. the printed 60% has to be measured as approx. 60%). If they do not, create a *new* curve in addition to the existing one, adding it *before* the existing curve, and enter the measured values (e.g. 60% printing as 61%).
- Select whether to print a single black page or all four process colors.
- Select whether to print immediately or preview before printing.
- Click print.



### 6.3.3 Calibration manager

The calibration curves can be added, removed or edited in the *Calibration manager*. Just creating a calibration curve is not enough, it will have to be applied to a specific job style – otherwise it will have no effect. However, the user will be prompted, after finishing defining a calibration curve, to decide how to apply the new calibration curve; this dialog box is explained below under the section 6.4.6 *Applying a calibration*.

To create a new calibration curve, click on the *Add* button in the *Calibration manager* window. To edit an existing calibration, double click on it within the *Calibration manager* window. The *Calibration curve editor* window will appear.



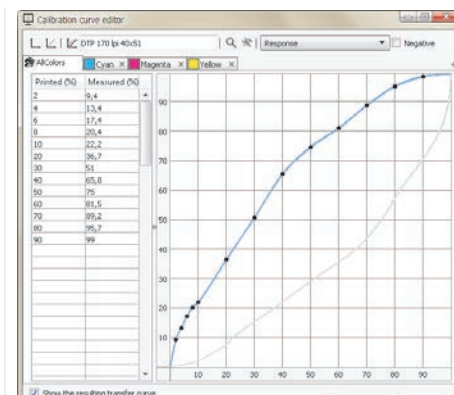
### 6.3.4 Calibration curve editor

The calibration curve editor allows the user to build several calibration curves (each curve being assigned to a color) by entering value pairs (typically printed and measured values) into tables. It is also possible to edit the curves manually by dragging the setpoints on the curve with the mouse.

The entered values can be integer or decimal values, in the range of 0–100. More value pairs will result in a better defined calibration curve, especially at the extremes (close to 0 and 100%). The values entered in the two columns depend on the curve type.

The following tools are available:

- **Curve name:** the name of the calibration curve.
- **Clear:** erases the table of the current tab.
- **Initialize:** fills the table with the default values of the StudioRIP calibration page.
- **Copy values:** copies the table contents of the *All colors* tab into the currently selected tab.
- **Dotmeter:** launches the microscope based dotmeter window, see [6.3.5 Microscope-based dotmeter \(page 97\)](#).
- **Dotmeter settings:** opens the microscope based dotmeter setup dialog.
- **Curve type:** there are four types of calibration curves in the StudioRIP system:
  - **Response curve:** the most common curve type, use this curve for device linearization. The columns are filled with the printed value (written on the calibration page) and the measured value (read on the densitometer). The inverse function of the curve will be applied over the percentages coming from the PS/PDF file (e.g. if a printed 50% is measured as 60%, then a 60% coming from the PS/PDF file will be transformed into 50%, knowing that the printed result will be 60%, i.e. the desired value).
  - **Transfer curve:** the most straightforward curve type, use this curve for changing the percentages coming from the PS/PDF file directly with a curve. The values in the left column will be transformed to the values in the right column.
  - **Desired dot gain:** the first item of a desired-actual curve pair used for dot gain compensation, use this only in conjunction with an actual curve, and use it only as the *first* item of the pair. Contains the printed-measured value pairs of the *target* press (i.e. the one that is considered as desirable). Usually these values are taken from ISO standards, but can be taken from real prints too.
  - **Actual dot gain:** the second item of a desired-actual curve pair used for dot gain compensation, use this only in conjunction with an desired curve, and use it only as the *last* item of the pair. Contains the printed-measured value pairs of the *actual* press (i.e. the one that needs to be corrected). Use a paper dotmeter or densitometer to fill in the measured column.
- **Negative:** check this box for negative curves, see the next section for details.



- **Show the resulting transfer curve:** shows, with gray, the actual curve that will be applied over the percentages coming from the PS/PDF file. For example, for a response curve this will be the inverse function of the defined curve.
- **Fill dotmeter result:** if checked, pressing the button on the microscope will not just display the measured value, but will also fill it into the table, jumping to the next row. Note that holding the CTRL button will average the measured values, entering it as one table item on the release of the CTRL button.
- **Add color:** pressing the + button on the right side of the tabs will add a new tab for a new color. Typically a calibration file contains the four curves of the four process colors, but curves can be assigned to any color (e.g. *Pantone 123 C* can have its own calibration curve).

The calibration curve in the picture is typical for an average quality CTP device on a relatively high line screen (175 lpi). As shown, a 50% tint came out as 58% (as measured by the densitometer). With the calibration curve applied to the dot, when a job has a 50% tint in it, the rip modifies this downwards (printing maybe 42%), forcing the print engine to produce an accurate 50% tint. It does this across the full range of tint values for the dots that it has been applied to.

Printed or measured values of 100% or printed values of 0% will be rejected (the value pair will disappear after entering it). The reason is that they would lead to wrong results, such as 100% tints having halftone dots: if the '98% measured as 100%' value pair is entered in the table, the RIP would – correctly – assume that printing 98% will result in a 100% tint. Indeed, the densitometer would measure the printed 98% tint as 100%, however, most operators would consider this abnormal behavior, and would expect 100% always to be printed as 100%.

On the other hand, this policy will prevent operators from defining such limitations intentionally (e.g. limiting the maximum tint to 90%, common in the gravure industry, or knocking out tints below 2%, common in the flexo industry). These limitations can be defined in the screening type settings, see [9.7.3 Limits tab \(page 161\)](#).

### 6.3.5 Microscope-based dotmeter

StudioRIP can use certain USB microscopes as fairly accurate dotmeters. Not all USB microscopes are supported, the most important requirements are:

- **webcam-style:** the microscope must be able to provide continuously moving image;
- **snapshot button:** pressing this button, the webcam should be able to take a high resolution still image;
- **high resolution:** a resolution of 1600×1200 is recommended for accurate results;
- **auto exposure OFF:** the camera must allow the automatic exposure controls to be turned off, otherwise the colors would change depending of the dot percentage, spoiling the results;
- **stable focus:** many cameras, especially the vertical ones, are don't have stable an even focus on a flat surface; the focus ring is often very unstable too; microscopes with more contact points with the flat surface are recommended.

Once the right camera has been chosen, connect it, launch the calibration curve editor, then click the *Dotmeter* button. An image preview window should appear on the right side. For setting it up, follow the steps below:

- **choose the right camera:** press the *Dotmeter setup* button, then choose the USB microscope from the list of available camera devices. If it isn't listed, your camera is probably not compatible with the StudioRIP system.
- **adjust the focus:** the focus lens often has two focal points, at a small and at a high magnification. Choose the high magnification position – ideally about 5–15 screen dots of 150–175 lpi should be visible across the image width;
- **adjust the light:** if the light has a potentiometer, use it on the maximum if possible, that way ensuring that the light intensity won't change between measurements;
- **adjust the image controls:** press the *Filter properties* button, turn off everything that is automatic, then adjust the manual controls until the image has good quality with realistic colors;
- **calibrate:** place the camera over the plate that you wish to use the dotmeter with, on a 40–60% halftone that has enough areas of both colors; note that the goal of the calibration is to set up color recognition, so the exact percentage of this tint is unimportant.
- **choose the right fine tuning curve:** the StudioRIP install kit may come with pre-installed fine tuning curves which can slightly correct the measurement results according to the plate type and used screen type. If no curve is chosen, no correction will be applied (this is the default).

Once the camera is set up, place the camera over the patch to measure, and click the snapshot button of the camera. The result should appear above the table. If the *Fill dotmeter result* box is checked, the result will be also filled into the table, and the next table row will be focused.

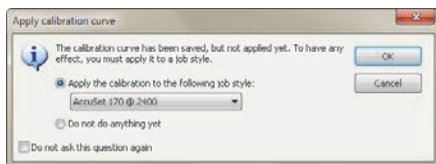
A powerful feature of StudioRIP's dotmeter feature is that it can average measurements. Press and hold the CTRL button, do several measurements, then release the CTRL button: the average of the measurements will be filled into the table (the status bar of the window shows more useful information during the measurements such as current, minimum, maximum and average percentages, as well as the maximum deviation from the average).

Pressing the SHIFT button will temporarily override the *Fill dotmeter result* setting, leaving the table unchanged, but displaying the measurement result above the table.

#### 6.3.6 Negative calibrations

A special case of calibration is to calibrate a system that works with negative output. To calibrate such a system, do the following:

- print a calibration page with the same settings you intend to print your jobs (therefore in negative),
- check the *Negative* box of the *Calibration curve editor* dialog.



- enter the values just as you read them (e.g. Printed: 10, measured: 95).

### 6.3.7 Applying a calibration

Once the calibration curve has been created and saved, it can be applied to one or more job styles. Job styles store *references* to the curves rather than the curves themselves, so several job styles can use the same calibration curve. Changing a curve will therefore obviously have effect to all jobs processed with the job styles using it.

When creating or modifying a calibration curve, pay attention to the following rules:

- Curves created with the *Create and add* button of the *Calibration* task will obviously be applied to the edited job style.
- Curves created from the *Calibration curves* docker will need to be applied manually. Use the *Add* button of the *Calibration* task in order to apply them to job style(s).
- Curves modified either from the *Calibration* task or from the *Calibration curves* docker will have effect on all jobs processed after the change, assuming that the curve has already been applied to the used job style.
- The *Dot gain compensation wizard* can automatically add the curves to job styles.

It is also important to use the right order when working with multiple curves:

- Curves are applied in the listed order (i.e. a percentage coming from the PS/PDF file will go through the first curve, then the resulting value will go through the next curve, and so on).
- New curves fine tuning the old ones should always be added *before* the old curves.
- Dot gain compensation should always be added *before* the linearization curves.
- The dot gain compensation curves should always be in pairs, the *desired* curve followed by the *actual* curve.
- For a deeper understanding of the curve orders, see [6.1.9 Calibration task \(page 76\)](#).

## 6.4 DOT GAIN COMPENSATION

### 6.4.1 Understanding dot gain

Dot gain is a widely misunderstood subject. Pre-press operators are usually surprised to find out that a 50% halftone will become 60-70% on the paper; moreover, it *must* be 60-70% on the paper to produce the expected result.

For historic reasons, today's printing industry has ended up with quite a complicated and difficult way of controlling the dot gain of printing devices:

- The plate or film is linearized with calibration curves; therefore a 50% halftone will be measured as 50% on the film or plate.

- Printing it on the press, a dot gain occurs, and the 50% halftone typically becomes 60-70% on the media.
- The printed result is profiled, and an ICC file will be created that describes the connection between the device independent Lab color space and the CMYK color space of the press.
- When separating a Lab or sRGB color in the DTP application or in the RIP (i.e. converting it to the CMYK color space of the device), the conversion algorithm will inherently take into account the dot gain of the press, as described in the ICC profile. However, the ICC profile contains the dot gain information only indirectly, as CMYK-Lab value pairs, rather than as explicit dot gain curves.

The main disadvantage of this method is that the line screen or dot shape settings, the paper type, the print technology or press type have influence on the dot gain, therefore using the same ICC profile might produce very different results. On the other hand, profiling a press is so long and complicated that almost nobody does it; not to mention doing it with all the different paper types, halftone settings etc.

If the printing industry worked on the principle of linearizing not just the imagesetter/CTP, but the output too, using a second set of curves (i.e. having the 50% halftone actually 50% on the paper), life would be much simpler: printers would have better control over the output (checking for the accuracy of the percentages), and the differences between the various ICC profiles would be much smaller (in most cases using the same generic ICC profile would produce satisfactory results after a successful linearization).

Unfortunately the current practice is such that the printing industry doesn't use linearized presses; therefore things are much more complicated. To make matters even worse, CMYK became an industry standard in pre-press (i.e. designers convert everything into CMYK, considering RGB an 'unprofessional' color space), without knowing exactly what CMYK color space are they actually using (but generally using the default offset color space of the DTP applications).

Dot gain compensation is a method that tries to deal with this unfortunate situation: instead of linearizing the output device, it tries to reach the dot gain that is expected by the ICC profile used in the color separation process. In simple terms, it will try to give *exactly* 68% (or whatever the printing standards expect) on the paper for the 50% halftone screen.

#### 6.4.2 Why use dot gain compensation?

Though the ideal solution would be to have an ICC profile for each paper type, line screen etc., in reality dot gain compensation is the only practical way for most printing houses to correct for dot gain problems.

Dot gain compensation is typically used for correcting the slight dot gain variations of the offset press caused by technological issues like different plate type, higher halftone frequency, older press machine, etc., trying to match a generic (or ISO standard) offset ICC profile used in the pre-press process. However, it may be useful even for printing jobs separated using a generic



offset profile on completely different technologies like flexography or silk screen printing – having, at least, the right dot gain is usually a great quality improvement.

If any of the printing parameters are substantially different (e.g. stochastic screening instead of AM), it is almost certain that dot gain compensation will be needed. However, there are so many parameters involved in the printing process that at least checking whether the dot gain is correct or not is definitely recommended.

If the dot gain is substantially different, first search for technological faults (non-linear plates, or film, wrong exposure time, wrong ink density on the paper, etc.). If all the possible technological faults are ruled out, dot gain compensation will be needed.

#### 6.4.3 Density based dot gain compensation

The first – and most common – scenario to set up gain compensation is to extract the target dot gain values (typically from ISO standards), or to measure them with a dotmeter or densitometer on a press that is considered as having the desired dot gain. The resulting curve is saved as a *Desired dot gain* curve.

Then calibration pages are printed with the system to be set up – either the built in calibration pages of StudioRIP, or any other patches with known percentages. Measure the printed results with a dotmeter or densitometer, build another curve, and save it as an *Actual dot gain* curve.

Then apply the two curves to a job style, making sure that the curves are in the right position and order (desired, actual, followed by any linearization curves). From this point on, the printed results should have the right percentages.

#### 6.4.4 Spectrophotometer based dot gain compensation

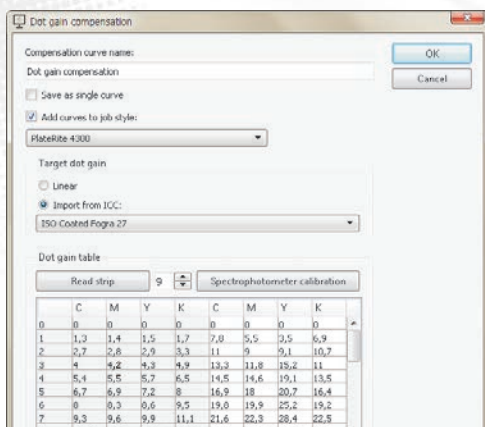
The second dot gain compensation technique uses a spectrophotometer. Although a spectrophotometer is unable to measure dot percentages or densities, it can approximate them from the Lab measurements. Having both the target and the actual values extracted from Lab measurements, the density values will be consistent.

The steps of the spectrophotometer based dot gain compensation procedure are as follows:

- The target ICC profile is chosen. This is the profile that is used for color separation (typically *ISO coated*). StudioRIP extracts the desired dot gain curves from the chosen profile.
- A dot gain compensation chart is printed (e.g. on the offset press). The chart can be found in the *Proof charts* folder of the installation CD.
- The chart is measured with a spectrophotometer, and StudioRIP will build the actual dot gain curves.
- The curves will be added to the desired job style either as separate curves, or as an equivalent single curve.

#### 6.4.5 Dot gain compensation wizard

The dot gain compensation wizard performs a spectrophotometer based dot gain compensation (the dotmeter based procedure is simple and straightforward, so it doesn't need a wizard). The



first step of the dot gain compensation procedure is to print the *Dot gain compensation* chart suitable for the installed spectrophotometer, located in the *Proof charts* folder of the installation CD. The file has to be printed with the linearization curve applied (if used), but without any dot gain compensation curves applied.

You will also need a spectrophotometer attached to the StudioRIP system. See [10.2.1 Spectrophotometer setup \(page 170\)](#).

If you have the chart printed and the spectrophotometer installed, open the *Dot gain compensation* window from the *Calibration* menu. The following settings will be available:

- **Compensation curve name:** the name of the calibration curve. Four curves will be created, with the ink name appended to the end of the chosen name.
- **Save as single curve:** if checked, StudioRIP will save the actual and desired curves as a single equivalent curve.
- **Add curves to job style:** if checked, the created curves will be also to the chosen job style, otherwise just the curve(s) will be saved.
- **Target dot gain:** specifies how the target dot gain values are initialized in the dot gain table:
  - *Linear:* the output device will be linearized (i.e. no dot gain);
  - *Import from ICC:* the table will be initialized with the dot gain extracted from the chosen ICC file.
- **Dot gain table:** the dot gain table contains nine columns in three groups:
  - **Printed:** the first column, containing the printed values;
  - **Desired:** columns 2-5, containing the desired percentage for each of the CMYK inks;
  - **Measured:** columns 6-9, containing the actual (measured) percentages for each of the CMYK inks.

The four strips of the *Dot gain compensation chart* will have to be read with the spectrophotometer. Then, after reading all four strips successfully, the OK button will become active, and the curves can be saved. If the *Add curves to job style* box was checked, the curves will be added to the chosen job style too.

#### 6.4.6 Checking the dot gain

For dotmeter based dot gain compensation simply use the dotmeter to check the resulting percentages against the desired values. For spectrophotometer based dot gain compensation follow the instructions of the 6.5.4 *Dot gain compensation wizard* section, with the following differences:

- If you want to check the accuracy of the previously performed dot gain compensation pro-



- **RGB:** these values are interpreted as sRGB values.
- **CMYK:** these values are device dependent, and will be interpreted according to the ICC profile specified for the current job (in the *Separation profile* field of a job style). The value of the ICC profile box in the right of the *Color model* box will not be stored, and is used for local visualization purposes only.

- **Color values:** the definition of the color in the specified color model.
- **Type:** specifies the ink type (normal, transparent, opaque, ignored). This value will be used by the trapping module.
- **Neutral density:** also used by the trapping module, specifying the darkness of the ink (so that the lighter tint will always be spread under the darker one).
- **Custom neutral density:** if unchecked, the neutral density will be calculated automatically based on the color values.
- **Old and new ink:** the preview of the original and the edited ink.

## 6.6 USER MANAGEMENT

By default, StudioRIP is configured for a small office network, letting StudioRIP clients connect without any password protection. In many cases this will be unsatisfactory. Typical reasons are:

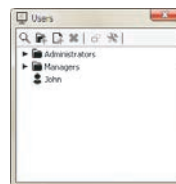
- To prevent unauthorized user access, when StudioRIP's Server is accessible from the Internet.
- To restrict access to only a select group in the enterprise when StudioRIP is running within the corporate network.
- To compartmentalize StudioRIP use, for example, by having a group of users who are only allowed to print jobs, but not permitted to modify the RIP settings.

To overcome these issues, StudioRIP has built-in user management. This restricts access to the Server by the creation of accounts with user names and passwords, and the removal of unprotected accounts, such as the *Default user*.

### 6.6.1 Users window

The user accounts are managed in the *Users* window. The accounts listed here can be changed or deleted, and new accounts can be created. At least one account must exist in the system; it is not possible to delete an account if it is the last remaining one on the list. When StudioRIP installs, there is a user named *Default user*, with a blank password. To add password protection, the blank password will have to be replaced, or new users created and given passwords, not forgetting to delete the default user.

To add a new user, click on the *Add* button in the toolbar of the *Users* window. To edit an existing user's properties, double click on the user name.





### 6.6.2 User properties window

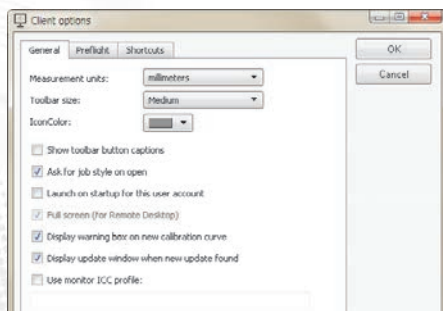
When editing an existing user account or creating a new one, the *User properties* window will appear. Specify the login name and password of the user account, as well as the special rights.

Users who can change both settings and manage users are, in effect, StudioRIP administrators.

Users who can neither change settings nor manage users have full use of the RIP; they can print jobs, make impositions, etc., however they cannot make any changes which could impair its functionality.

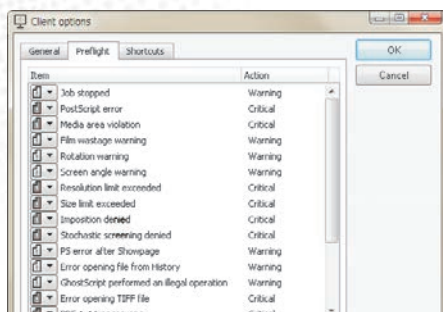
## 6.7 CLIENT OPTIONS

*Client options* are a set of options stored separately from the global settings of StudioRIP (see [6.8.1 Server options](#), page 106). Specifically, a set is stored for each client, with the client itself; therefore each client can have its own settings. Most of these settings are hidden (i.e. non-user managed, such as the sizes of the dockers), but others can be accessed from the *Client settings* dialog and set manually.



### 6.7.1 General tab

- **Measurement units:** inch, millimeter, centimeter, point and pixel options; if for some reason the pixel is undefined (there is no device resolution to calculate with), a default 1000 dpi is used (so  $1000 \text{ pixels} = 1 \text{ inch}$ ).
- **Toolbar size:** the size of the main toolbar;
- **Icon color:** the color scheme of the icons (any RGB value can be chosen);
- **Ask for job style on open:** if this option is checked, the *Job style* dialog will always appear when opening a job with the Client;
- **Show toolbar button captions:** specifies whether the toolbar buttons have texts under the icon (recommended only for large icons).
- **Display update window when new update found:** StudioRIP checks regularly for updates on the StudioRIP web site. With this setting turned on, new versions will be reported on the Client.
- **Use monitor ICC profile:** uses an ICC profile for the monitor of the given workstation, linking the sRGB color space to the device RGB space of the monitor. Note that many monitor calibration software will apply the monitor ICC on system level, in which case applying it again here will lead to wrong result.



### 6.7.2 Preflight tab

The **Preflight** options let the user customize the severity levels of the preflight warnings. If some warnings are perceived as annoying by the user, the warnings in question can be set to "Ignore" to stop it appearing. The action of each warning can be set by clicking on the small triangle near the item, and selecting the desired action (*Ignore*, *Warning*, *Critical*).



### 6.7.3 Shortcuts tab

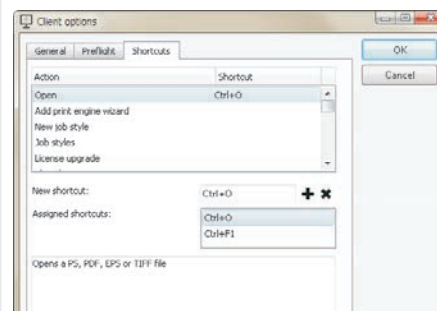
The shortcuts tab allows the user to customize the keyboard shortcuts. Shortcuts can be assigned to menu items (such as Open), as well as to other special actions such as changing the preview tools or zooming.

To assign a shortcut:

- Select the action in the action list the shortcut has to be assigned to,
- Click in the *New shortcut* box,
- Press the new keyboard shortcut,
- Click the *Add shortcut* button,
- If the shortcut has been used in another action, it will be automatically removed,
- The new shortcut will be added and will appear in the *Assigned shortcuts* box.

To remove a shortcut:

- Select the action the shortcut has to be removed from,
- Select the shortcut to remove in the *Assigned shortcuts* list,
- Click the *Remove shortcut* button.



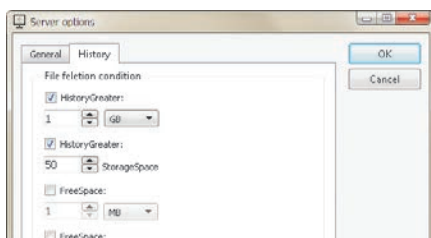
## 6.8 OTHER SETTINGS

### 6.8.1 Server options

The *server options* are global settings for StudioRIP:

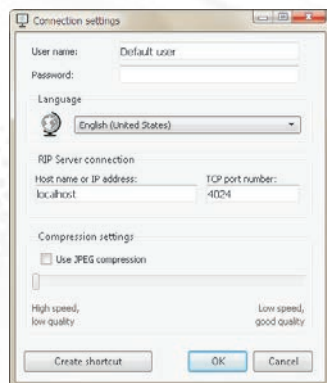
- **Imposition buffer size** affects how quickly a page can be rotated on the final rendering (when it is sent to the Print manager). A value of 100 MB is usually enough for a good speed, larger values may cause problems in the memory management of StudioRIP.
- **Search for updates automatically:** enables or disables the automatic internet update feature of StudioRIP. If turned on, StudioRIP will regularly check for a new version on the StudioRIP web site, and if available, will propose downloading it and updating the current installation.
- **Limit number of printers:** by default, StudioRIP creates a shared Windows printer for each defined job style. Operators may prefer to avoid this, especially when having a large number of job styles. Turning on this option will limit the number of created printers by setting the default value of the *Windows printer* field to *No printer* on job style creation, whenever the number of printers has reached the specified limit. Note that the setting has no effect on the previously created printers, and it can also be overridden for each job style creation.





- **Share the created printers:** turning this option off, the *Windows printers* field will be defaulted to *Local printer* (or *No printer*, see above) on job style creation.
- **Allow lazy write for TIFF files:** when disabled, StudioRIP writes the TIFF files to the HDD without using the cache system of the operating system (keeping the RAM free). Enabling it may speed up the RIP, but increases the risk of memory problems (even system freezes).
- **Server hot folder:** the location where the Server creates the hot folder system of the job styles.
- **File deletion condition:** controls the cleanup rules of the *Job browser* history (that keeps the source PS/PDF file, as well as the job in the state it's been before sending to the Print manager — note that there is another history for the *Print manager* jobs, that one can be controlled from the *Print manager* settings). It is very important to use some kind of cleanup mechanism, otherwise sooner or later StudioRIP will fill up the HDD. The settings can be combined (for example, if *Free space is less than 10 GB* and *File is older than 365 days* are checked, files will be erased when the free space is under 10 GB, but files older than a year will be deleted anyway).

- **History folder is greater than** a certain limit (physical size or percent of the HDD). This option will limit the HDD space occupied by the Print manager to within a certain limit, providing space for other programs.
- **Free space is less than** a certain limit on the HDD (physical size or percent of the HDD). This option is useful when StudioRIP runs on a dedicated computer, and maximizes StudioRIP's use of available HDD space.
- **File is older than** a certain number of days. For example, if this number is set to 7, files older than a week will be deleted.



### 6.8.2 Connection settings

The connection settings dialog can be accessed by the *Connection settings* item in the *Tools* menu, or by clicking *Cancel* after a failed connection attempt.

Available settings:

- **User name and password:** if there are users added to the StudioRIP system, you may use one of the defined user names and passwords. Otherwise use *Default user* as user name, and leave the password box empty.
- **Language:** each Client can run using a different language, as specified here. Note that only certain languages are supported by the StudioRIP system.
- **Server host name or IP address:** the network address of the computer running the StudioRIP Server. This is the setting which usually has to be changed when connecting from a workstation.
- **TCP port number:** the number of the TCP port used by the Client to connect to the Server. If it is changed, it has to be done in sync with the Server. The default value is 4024.

- **Use JPEG compression:** if the Client will be connected over the Internet or over some other slow network connection, it is recommended that JPEG compression be selected to reduce data traffic and thus speed up response. The compression ratio can be adjusted.
- The **Create shortcut** button will save a Client shortcut to the desktop with the current settings (i.e. visible in the dialog, but not necessarily saved). Several Server applications can be accessed from one PC by creating a shortcut for each Server (this is useful for support engineers or system administrators who are looking after several StudioRIP systems). See [3.1.3. Creating special Client shortcuts](#) (page 30) for further details about the created shortcuts.

After pressing OK, the settings entered in this box will be stored, and the Client will disconnect and then reconnect automatically with the new settings.

7

# Print manager

*Print manager* is a separate program that outputs the processed pages. It may run on the same computer as the Server, or on a different computer in the network. More than one instance of Print manager can also be used for multiple print engines.

Print manager has its own settings interface, but the Print manager docker of the StudioRIP Client application provides most of its visual interface. The Client connects to the Server application, and the Server is connected to one or more Print manager applications, some of them on different computers. This is daisy-chained communication, and it is not necessary for the Client to have direct connection to the Print manager(s).

## 7.1 CONFIGURATION

Print manager can be configured by its *Settings* dialog. This can only be done from the computer that runs Print manager (the Client is not able to access these settings).

Open this dialog by clicking the small printer icon of the Print manager in the system tray.

**If the Print manager is running as a system service, access to this dialog is not possible. In this case, stop the Print manager service by the Services administration tool, and then start the Print manager as a regular application.**

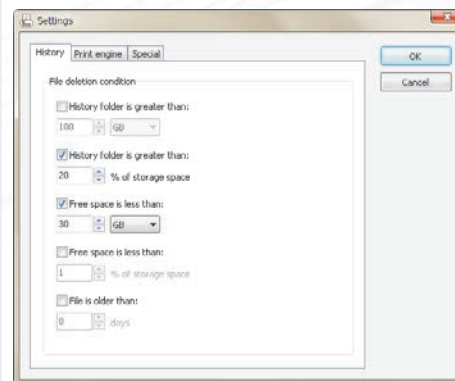
### 7.1.1 History cleanup settings

The most important configuration settings of the Print manager are the *History management* settings. These settings control how the Print manager deletes old files from the history and, by doing so, keeping the hard disk drive (HDD) from filling up or storing more information than desired.

By ticking the appropriate boxes, the files will be deleted in chronological order when any of the following conditions are met:

- **History folder is greater than** a certain limit (physical size or percent of the HDD). This option will limit the HDD space occupied by the Print manager to within a certain limit, providing space for other programs.
- **Free space is less than** a certain limit on the HDD (physical size or percent of the HDD). This option is useful when StudioRIP runs on a dedicated computer, and maximizes StudioRIP's use of available HDD space.
- **File is older than** a certain number of days. For example, if this number is set to 7, files older than a week will be deleted.

These settings can be combined (for example, if *Free space is less than 10 GB* and *File is older*

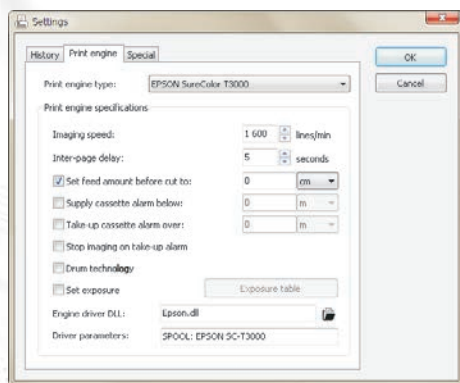




than 365 days are checked, files will be erased when the free space is under 10 GB, but files older than a year will be deleted anyway).

It is very important to check one of these options, allowing StudioRIP to keep some HDD space available for efficiency and for system stability. It is recommended that about 10 GB HDD space is kept free (the temporary files of StudioRIP might need a few gigabytes).

If you notice that the History doesn't keep even the recently printed files (they are grayed out the moment they appear in the list), certainly one of the conditions above is true all the time (e.g. the HDD space is already less than 10 GB), and therefore StudioRIP tries to keep the needed HDD space by deleting them immediately.



### 7.1.2 Print engine settings

The *Print engine settings* are normally defined when running the *Add print engine wizard*. However, if using a print engine that is not listed, the settings will have to be entered manually. Other settings, such as the take-up cassette alarm settings, would normally be set manually.

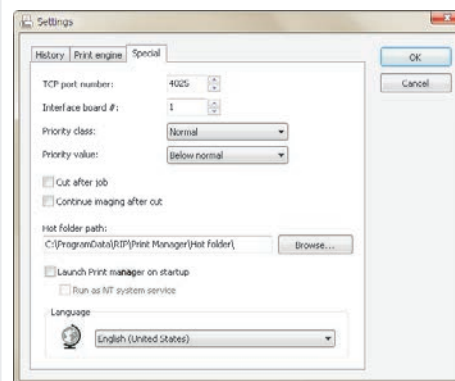
- **Imaging speed** and **inter-page delay** helps the engine to calculate the imaging time; normally the speed of a laser-based print engine is given by the speed of the spinner and the resolution, the spinner speed is same for all the resolutions (so 2400 dpi is twice as slow as 1200 dpi); the inter-page delay is very important on drum machines, where a good part of the time is taken by advancing the media, moving the carriage, or waiting for the on-line processor;
- **Set feed amount before cut:**
  - **Unchecked:** Print manager will send a simple cut command, without specifying the length of the feed to the imagesetter. The settings of the engine or a default value will be used.
  - **Checked:** The feed amount is set by the Print manager, overriding the settings in the engine.
- **Drum technology** option helps the Print manager to display the used media length correctly.
- **Supply** and **take-up cassette alarm** settings will specify when the StudioRIP Client should show, by blinking the cassette icons in the cassette manager toolbar, that there is too little media in the supply cassette or too much media in the take-up cassette.
- **Stop imaging on take-up alarm:** if this option is checked, the imaging will stop when the amount of media in the take-up cassette reaches the preset level (see above). Until the cassette is cleared, jobs can only be printed one by one, clicking on the *Start* button after each printed page.
- **Set exposure:** if ticked, the rip will set the density of the engine to the exposure value previously set in the exposure table. This will only happen if the resolution/exposure pairing exists in the table.

The driver files used for the print engine, interface board and its parameters (typically the communications port) are specified through the **Engine driver DLL** and **Driver parameters fields**. These are engine specific and are normally configured at initial setup. Contact your dealer if there are problems with these.

### 7.1.3 Special settings

Further settings available in the Special tab of the Settings dialog:

- **Hot folder path:** Specifies the folder for receiving the incoming TIFF files from the server. For installations with multiple hard disk drives or partitions, it may be necessary to change this setting. This is the place where the large amounts of data files are stored. Be sure, when modifying the location of the hot folder, to also change the setting in the job styles too. Also, be sure to move the contents of the original hot folder to the new location.
- **TCP port number:** As explained above, this is the port number that the Print manager 'listens' for the Server to connect, the default value is of 4025. For multiple instances of Print manager on the same computer, this port number will be automatically set to a different value by the Setup program.
- **Board index:** if there is more than one board in the system, this index identifies them; the index is allocated by the BIOS of the computer; the boards are numbered from 0; see section [7.2.4 Interface board index \(page 115\)](#).
- **Priority class and priority value:** Print manager, by default, runs at a very high priority in the system, enabling it to serve the print engines with a continuous flow of data (Priority class: High, Priority value: Time critical). If there are any engine interruptions, a higher value should be chosen. Warning: this may result in the PC running Print manager becoming non-responsive to user actions (effectively, to freeze) whilst outputting to the print engine.
- **Continue imaging after cut:** normally the Print manager enters pause mode after a cut operation, requesting user intervention before continuing working. However, on certain machines this isn't necessary, and imaging can continue after a cut operation. Use this option in such situations.
- **Launch Print manager on startup:** if checked, Print manager will be started automatically on the system startup.
- **Run as NT service:** used in conjunction with the previous setting. If checked, Print manager will be started as a system service, but will not have an icon in the system tray, and will be started before any user login.
- **Language:** the language of the Print manager application (does not affect the language of the Print manager docker in the Client applications).



## 7.2 NON-STANDARD SCENARIOS

Possible scenarios for placing *Print manager* relative to the *Server*:

- One Print manager, using the same computer as the Server; this is the fastest and recommended scenario, it is also the default.
- Print manager on a different computer, done for several possible reasons (bigger HDD capacity, logistical reasons etc.);
- Two or more Print managers, some of them on the same computer as the Server, others on other computer(s).

In all of these scenarios, there is one StudioRIP Server that connects to all the Print managers. The Client application will treat all these Print managers as items in the Print manager list, controlling them directly and easily.

### 7.2.1 Installing Print manager on another computer

To install a Print manager on a different computer than the one running StudioRIP Server, run the Setup program on that computer, choose the *Print manager* option in the setup wizard, and follow the steps described in section [2.2.8 Installing StudioRIP \(page 23\)](#), then set it up as described in section [3.1.1 Starting Print manager for the first time \(page 28\)](#).

Once Print manager is set up and running, the Server has to be connected to it. To do this, start the Client. If there is no other print engine defined in the system, the *Add print engine wizard* will be launched automatically by the Client. If a print engine is already defined, launch the wizard manually, from the *File* menu.

Follow the steps described in chapter [3.1.4 Starting the Client for the first time \(page 30\)](#). The most important thing is to choose the *Different computer* option, specifying the IP address or host name of the computer, which runs the Print manager to be connected to.

The Server will then try to connect to the Print manager. The connection is done through two channels:

- A control channel through a private TCP port, by default 4025.
- A data channel through a shared hot folder.

If the Server and Print manager run on the same computer, these data channels are usually set up without problems. However, when they run on different computers, the procedure is more difficult:

- Make sure that TCP port 4025 is not blocked on the PC running Print manager (either by turning off firewalls and antivirus software, or configuring them to let this port in).
- Share the hot folder of the print manager. By default, the hot folder on a Windows 8, Windows 7 or Vista system it is defaulted to `C:\ProgramData\StudioRIP\Print manager\HotFolder`, on an XP computer is in the `C:\Documents and Settings\All Users\Application data\StudioRIP\Print manager\HotFolder`. The path can be different if a different data folder has been specified on setup, or there is more than one Print manager on the same PC. Make sure to enable write access too.

- It is recommended that the functionality of the share is verified (i.e. a file can be successfully copied into the shared folder from the Server PC, using Windows Explorer).
- In the first step of the *Add print engine wizard*, set up the network path of the shared hot folder (e.g. \\WorkstationPM\HotFolder).

If the connection does not succeed (no control or data link), check whether the IP or host name is correct, whether there is a firewall or other obstacle between the Server and Print manager computers, the hot folder is properly shared and the share name is properly entered in the wizard.

### 7.2.2 Installing two Print managers on the same PC using the Device manager

To run more than one instance of the Print manager on the same computer, the easiest solution is to run the *StudioRIP Device Manager* application. For this, launch the application from the Start menu, or right-click the tray icon of a running *Print manager*, then click the *Device manager* menu item.

The StudioRIP device manager will display the currently installed *Print manager* applications on the PC. You can add, remove, start and stop Print managers using the buttons in the toolbar.

When a new *Print manager* is added, the *Device manager* will automatically assign an index to the newly created *Print manager*, configuring the TCP port of the control channel and the hot folder path accordingly. Then the *Print engine setup wizard* will be started, see [3.1.1 Starting Print manager for the first time \(page 28\)](#).

Once Print manager is set up and running, the Server must be connected to it. To do this, start the client, and launch the *Add print engine wizard* manually, from the *File* menu.

Follow the steps described in chapter [3.1.4 Starting the Client for the first time \(page 30\)](#), making the following settings:

- *Print manager instance index* has to be set to 2 for the second instance, 3 for the third instance etc. This setting will automatically modify the port number and hot folder path the Server will try to connect to.
- If the Print manager is on a different computer, select the *Different computer* option, specifying the IP or host name of the computer that runs the Print manager to connect to, as well as the name of the shared hot folder (see [7.2.1 Installing Print manager on another computer \(page 113\)](#)).

The Server will then try to connect to the Print manager. If it does not succeed, check whether the IP or host name is correct, or whether there is a firewall or other obstacle between the Server and Print manager computers.

If it finds a Print manager, other than the one that was expected, check whether the instance index is specified correctly.

When using the same kind of interface boards for the two or more Print managers, the board index will have to be set up. See chapter [7.2.4 Interface board index \(page 115\)](#).

### 7.2.3 Print manager instance index

One important point to note is that the Print manager instance index (which was specified when running the *Add print engine wizard* in the Client) is the instance index of the Print manager *on the computer where it is installed* rather than globally, in the StudioRIP system. Here is an example:

- On the computer called Server1, there is a Print Manager installed; the instance index of it will be 1, because it is the first Print manager on this computer; it will listen on port 4025, and its hot folder will be in the *Print manager* folder;
- On the same Server1 computer, another Print manager is installed; its instance index will be 2, because it is the second Print manager on this computer; it will listen on port 4026, and its hot folder will be in the *Print manager #2* folder;
- On another computer, Server2, a third Print manager is installed; its instance index will be 1 (and not 3), because it is the only Print manager on this computer, it will listen on port 4025 (and not 4027), and its hot folder will be in the *Print manager* folder (and not *Print Manager #3*).

### 7.2.4 Interface board index

If two Print managers use the same kind of board in the same computer (e.g. two PciAPIS boards are plugged into the same PC), the two Print managers will distinguish the boards using the *board index* parameter: one of the Print managers will use board #0, the other one will use board #1.

Installing a second board later may change the existing board numbering. The newly installed board may be numbered as 0, and the old one has changed to 1. This is because it is the BIOS of the computer that indexes these boards. In this situation change the cables, the boards or the indexes.

Not all boards support instance indexes. Ask your local dealer about whether the boards have support for this feature. If not, the second Print manager will have to be installed on another computer.

EtherSetter interfaces have a slightly different indexing policy, as they are networked and therefore may be visible from more PCs running Print managers.

## 7.3 ETHERSETTER INTERFACES

EtherSetters are proprietary StudioRIP interfaces for imagesetters and platesetters. They are small external boxes, connected by Ethernet to the RIP, and by a device specific cable to the print engine, implementing its specific hardware and software protocol (e.g. APIS, Pelbox, LI2/LI5, Speedway).

As they connect through Ethernet, they don't require Windows device drivers. The only prac-



tical problem connecting them is to create the TCP/IP link between the Print manager and the EtherSetter box. Usually the link is created automatically, without a setup procedure: the installation is smooth and easy in almost any network configuration. However, in special situations (multiple EtherSetters per network, EtherSetter and Print Manager in different LAN segments etc.), the information below might be useful. For further details see [2.2.2 Installing an EtherSetter box](#) (page 20).

### 7.3.1 Multiple EtherSetters per network

In case of multiple EtherSetter boxes per network, each Print Manager will choose its own EtherSetter box according to the *Interface board #* setting in the *Special* tab of the *Settings* dialog of the *Print Manager* application. There are two possibilities at this point:

- If default IP assignment is used (see [7.3.2 Default IP assignment](#) (page 116)), the numbering of the boxes is done in the increasing order of their unique IDs (board #1 in the system having the smallest ID, board #2 having the next ID etc.). This is a workable scenario only if all EtherSetter boxes will be turned on when the StudioRIP Print managers boot up.
- If static IP assignment is used (see [7.3.3 Static IP assignment](#) (page 117)), the numbering of the boxes is done based on the *EtherSetters.ini* file, which can assign a static IP to each of the boxes. This scenario will rule out the unique ID and boot order problems, but requires a special setup for each EtherSetter box.

In case of default IP assignment, it is critical that the procedure below (as well as each launch of the Print managers) is done with all boxes booted up.

**If a new box is introduced into the system, it will not necessarily have a higher index (as board index is determined by the unique ID of the boxes rather than by the order of appearance in the network).**

When new box(es) are introduced into the system, boot up the Print Managers one by one; if the Print Manager doesn't connect to the right box, change the interface board # and try again, until it connects to the right box.

**It is very important to have all boxes running when the Print Managers boot up. If box #1 is switched off during the boot-up procedure, box #2 will become box #1.**

### 7.3.2 Default IP assignment

By default (as well as after a reset operation initiated by pushing the reset button on the box) the EtherSetter boxes are configured to automatic IP configuration through DHCP. Normally they will get an IP just as any other computer in the LAN would, avoiding possible IP conflicts, and no further intervention will be needed (either from the user or from the Print Manager).

If the DHCP request fails, the automatically assigned IP will be 192.168.0.124. If this IP is outside of the subnet of the Print Manager PC, the Print Manager will choose an IP that is in the right subnet (e.g. if Print Manager has an IP of 192.168.3.23, then the chosen IP will be 192.168.3.124). If there are more EtherSetter boxes in the system, the last number of the IP will be increased (e.g. the second board will have an IP of 192.168.3.125 in the previous example), until a free IP number is found.

### 7.3.3 Static IP assignment

Static IP assignment may be needed when:

- the network administrator wants to control the IP of the box,
- the EtherSetter box and the Print Manager are in different LAN segments, and auto-setup broadcast packages are not propagated between them.

To configure the IP settings of an EtherSetter box, its HTTP service has to be accessed. For this, the IP address of the box needs to be known:

- if there is a DHCP server in the system, find out the assigned IP from the DHCP log or lease table, or if the Print manager gets an echo reply from the box, from the Event log of the Print manager;
- if there is no DHCP server in the system, the automatically assigned IP will be 192.168.0.124;
- if the IP of the box is outside of the subnet, modify temporarily the IP address of the PC to match the subnet of the box.

Typically you will have to access the `http://192.168.0.124` page. If the HTTP service of the box was successfully reached, it will ask for the user name and password, which are both set to 'admin' by default. Modify the settings, save them and then restart the box.

**Fill in all the fields correctly, not just the IP. The Linux system of the boards will detect faulty settings (e.g. the gateway being in a different subnet than the IP), and will not work correctly.**

As long as the Print manager can communicate on the set IP with the box, the IP will remain unchanged. However, in the event of a communication problem the Print manager may attempt to change the IP of the box. To make sure that the assigned IP will never change, it is recommended that the *EtherSetter.ini* file is modified accordingly, see the chapter below.

### 7.3.4 EtherSetter configuration file

There is a configuration file in the StudioRIP program folder (typically `C:\Program files\StudioRIP\EtherSetter.ini`). Normally this file doesn't need to be changed; however, for static IP

configuration it is recommended, especially in conjunction with multiple EtherSetter installations. The file contains records like:

```
[Board #1]
IP = auto
Port = 4023
```

Leaving the IP setting on *auto* will allow the Print Manager to negotiate an IP address with the box; it will keep the current (DHCP-assigned or static) IP of the box if the communication can be established on it, or will attempt to assign a new IP (by forcing a DHCP request, or on its failure, assigning one).

When static IP assignment is used, it is recommended that the static IP is entered into the configuration file instead of *auto*. This will instruct the Print Manager not to send broadcast messages at all, but rather to try to connect to the given IP directly. This is especially beneficial when multiple EtherSetters are used within the network.

The board number in brackets refers to the *Interface board #* field of the Print manager (see [7.3.1 Multiple EtherSetters per network \(page 116\)](#)). In case of one board per network, only the first record will have to be changed.

### 7.3.5 Establishing connection, step by step

In case of problems, a deeper understanding of how the Print manager establishes connection with the EtherSetter box may be necessary. Here is the step by step procedure:

- The Print manager reads the record specified by its Interface board # setting from the configuration file (see [7.3.4 EtherSetter configuration file \(page 117\)](#)). If a static IP is specified, it will try to connect directly. If auto is specified, it will follow the procedure below.
- It will broadcast an identification request. All the EtherSetter boxes in the network will reply with their current settings.
- It will choose the right box based on the Interface board # setting (see [7.3.1 Multiple EtherSetters per network \(page 116\)](#)), and will start to negotiate a suitable IP for it.
- If the IP of the box is in the right subnet, and isn't in conflict with other EtherSetter IPs in the subnet, it will connect to it.
- If the IP is not suitable, it will initiate another DHCP request (assuming that the cable was plugged in later).
- If the IP is still not suitable, Print manager will assign an IP address, identical to the IP of the PC, except the last number of the IP address, which is set to 124 (or, in case of multiple EtherSetters per network, 125 or more). For example, if the PC has an IP of 192.168.3.11, then the 192.168.3.124 will be assigned to the first EtherSetter box, 192.168.3.125 to the second one, etc.

As Epson printers allow StudioRIP a low level control of the printing process (droplet size, paper feed, head movement), operators can fine tune the available Epson printing parameters for their specific needs.

### 7.4.1 The Epson parameters

The Epson printer parameters can be configured in the *Print engine properties* dialog of Epson printer (accessible through the *Print engine properties* button in the toolbar of the *Print manager* docker). The following options are available (note that choosing *Default* for the options below means that the settings will either not be set (internal Epson settings) or the StudioRIP defaults will be used (internal StudioRIP settings).

- **Media type:** Epson printers have internal tables storing the optimum values of mechanical parameters like paper suction, paper feed adjustment, platen gap etc. for each genuine Epson media type. If you work with genuine Epson media, choose the right media type, and leave the other mechanical settings on default. If you use media from other sources (e.g. offset plates for inkjet), all mechanical settings will need to be fine tuned anyway, so the media type setting won't have much effect. An exception to this rule is the second set of rollers of the Stylus Pro 4900 printer which will grip the paper if the media type is set to plain paper, but will remain inactive if the media type is set to photo paper. Therefore it is recommended to keep the media type on photo paper for custom media.
- **Platen gap:** controls the distance between the media and the head, a critical setting for high quality jobs. Except for cases when quality isn't critical, but instead there is a risk that the head will hit the media, keep this on *Minimum*. The closer the head is to the media, the better the droplet placement quality will be. Note that on the Stylus Pro and SureColor series the *Minimum* platen gap setting combined with a media thickness of 0.3 mm or less will result in an effective platen gap of 0.8 mm (so for example the distance of the head from a 0.3 mm plate will be of  $0.8 - 0.3 = 0.5$  mm).
- **Roll tension:** controls the power of the motor that pulls the media backwards, against the media feed mechanism, in order to keep the media tight. It may be critical for high quality work.
- **Paper suction:** controls the power of the fans that pull down the media through the platen air ducts. We recommend keeping it on low values, otherwise the feed may become unstable.
- **Paper path:** controls the media source. Keeping it on the default value will let the printer to use the currently loaded media. However, if you want to avoid situations like printing offset plate content on proofing roll paper, or printing proofing content on offset plate, you may specify the paper path in the proofing and plate printing job styles, and having the wrong media loaded to the printer will raise an error rather than wasting the wrong media.
- **Paper feed adjustment:** a critical setting, controlling the correction that is applied to the media feed. Optimizing this setting for a given media type and size, you achieve a job of

one meter to have indeed exactly one meter length. This is important not just geometrically, but it also greatly affects quality: the wrong feed amount will cause unsharp dots and visible banding too, beside the wrong length. Set it up by measuring the actual length of a job of known length, and applying the right correction, in percentages. For example if a job of one meter prints as 1002 millimeters, then you need the new output length to be  $1000 / 1002 = 99.80\%$  of the current output length – in other words, you need a  $-0.20\%$  feed adjustment. Note that the feed adjustment has 3 possible modes:

- OFF: no feed adjustment is applied;
  - Absolute: the feed adjustment assigned to the current paper type is ignored, and the specified value is applied;
  - Relative: the feed adjustment assigned to the current paper type is used, but the specified correction value is applied over it.
- **Paper thickness:** specifies the thickness of the used media. With thickness values less or equal to 0.3 mm and with the *Platen gap* parameter set to *Minimum* the actual head-platen distance, according to Epson specifications, is 0.8 mm. For thicker materials the printer will increase the head-platen distance. Note that most professional Epson printers have automatic thickness detection.
- **Ink(s) used for separations:** specifies what ink(s) to be used when the printer is used as a separations device (e.g. inkjet platesetter or filmsetter). The following values are available:
- simple inks (e.g. Black, Cyan etc.): the printer will use the specified ink;
  - combination of two inks (e.g. Black + Cyan): the printer will use the two specified inks according to the *Second separation ink usage* parameter (see below);
  - twin pairs (e.g. Twin Orange + Green): useful on the 360 nozzles/channel models (e.g. Stylus Pro 7900) which have a special head design, allowing two channels of 360 nozzles each to work as one channel of 720 nozzles (either by using refillable cartridges with the same ink in both channels, or for technologies which don't care of the actual color of the ink).
- **Second separation ink usage:** is enabled only if the previous setting is set to a combination of two inks. The following values are available:
- *Double ink mode:* the two inks will be used on the top of each other, leading to double ink quantity;
  - *Horizontal twin mode left/right:* uses the two channels to emulate double horizontal resolution. Useful in  $2880 \times 2880$  dpi mode: the printer will be used on 1440 dpi horizontal resolution, but as two channels will be working together, the driver effectively controls 2880 droplets per inch. The difference from the real  $2880 \times 2880$  dpi mode is that in theory the placements of the droplets aren't fully accurate (the first and second droplets of



a scanline are supposed to print to the same position instead of being 8.81 microns away from each other), but taking in account that the typical nozzle placement inaccuracy of a printer is around 20 microns, in practice this won't make much difference. The *left/right* suffix of the mode can further improve the situation: if there is a vertical misalignment between the two channels (e.g. the cyan channel fires 8 microns to the left compared to the magenta channel), choosing the right suffix can take advantage of this, resulting in a  $2880 \times 2880$  dpi print that is mathematically perfect too. This mode is particularly useful on Stylus Pro 7700/9700 or SureColor T series models in conjunction with the *Black + other K channel* setting, when 4 channels of 360 nozzles each are used together for printing black, achieving the same speed for printing  $2880 \times 2880$  dpi data as a Stylus Pro 7900 would achieve on  $1440 \times 1440$  using a single channel.

- *Prefer first channel*: the same as above, but with a preferential use of the first channel: if only one of the two channels need to fire at a certain pixel position, then always the first channel will be used. Taking in account that the typical ink density used on  $2880 \times 2880$  dpi is around 40% (i.e. more than half of the droplets are removed by the density modulation system), about 90-95% of the droplets will come from the first channel. This has several benefits on the quality: on the SureColor T series the matte black channel is more accurate than the photo black (being in the middle of the head), using as few channels as possible also increases quality, and using genuine Epson ink, the MK ink is generally of higher quality for repro use (plate, film).
- **Black ink**: specifies whether the matte or photo black will be used (or treated as first channel in the case of *Black + other K channel* parameter).
- **Density modulation**: a very powerful feature of StudioRIP, allowing the ink density to change according to the halftone percentage, typically using high density on small dot percentages, and decreasing the ink density to higher halftone percentages. Note that due to the speed and quality issues of the density modulation implemented at this level (the halftone percentage needs to be computed from the 1-bit data), we recommend the density modulation of the screening module to be used instead. The driver based density modulation is still functional though for special situations. The available controls are:
  - *Off*: no density modulation is performed at this stage (recommended; use the screening module's density modulation instead);
  - *Constant*: no modulation is performed, but instead a constant density value is used;
  - *Curve*: the density is modulated according to the halftone percentage according to the specified curve (see below).
- **Outline protection**: specifies whether the outlines (e.g. the edges of screen dots or vectors) should have different density than the main areas, and if so, an outline of how many pixels to be treated in a different way.
- **Density table**: defines the density curves for the main areas and the outline. Enter the half-

tone percentage to the left column of the table, and the assigned density to the right column. For example if you want a 10% halftone to have full density, write 10 to the left column, and 100 to the right column. If you want the the 90% halftone to have 40% ink density, write 90 to the left column, and 40 to the right column. We recommend a smoothly decreasing curve to be used, with high density values for low halftone percentages, decreasing towards the optimal ink thickness of the 100% tint. Pay attention to the potential non-linearity caused by the too steep curves (e.g. a 20% halftone with 70% ink density may print lighter than a 15% halftone with 100% ink density). Normally the density range goes up to 100%, but in certain cases (low resolution and high density) you may need higher density than 100%. The allowed range is up to 300%. Note that using values above 100% will turn on variable sized droplet printing that works on half speed, so try to increase density by the use of more channels.

- **MicroWeaving:** controls whether the interlacing (i.e. building the final resolution such as  $2880 \times 2880$  dpi from the printer's native  $360 \times 720$  dpi by several head passes) is done by StudioRIP or by the printer firmware. Allowing StudioRIP to do the interlacing offers a wide range of quality control tools, and is highly recommended for high quality output like inkjet platesetters or imagesetters.
- **Quality:** suppresses the banding of the printer at the expense of printing speed, see [10.4.2 Banding \(page 184\)](#). Choose the highest speed that offers a pleasant, banding free output.
- **Quality enhancement:** specifies how many nozzles to disable of the 1 inch head. For example using just half inch of the one inch head will significantly improve the dot sharpness: all the geometrical and feed related issues causing inaccurate droplet placement will decrease together with the distance between the first and last nozzles.
- **Pass fading:** having the edges of the 1 inch wide band printed by a head pass being faded (i.e. the head pass will have a faded, blurred look instead of being a band with sharp edges), the feed inaccuracies will cause much less visible banding: instead of having a thin gap or overlap between two head passes, caused by the inaccurate feed, the error will be dispersed over a few millimeters.
- **Bidirectional mode:** specifies whether the print head prints in both directions (achieving almost double speed). It is recommended that it is turned off for top quality output (especially if halftones are printed), but in many cases (typically for contour proofs) the double speed is more important than the often barely visible quality loss.
- **Halve resolution:** increases speed by using half resolution (horizontally or vertically). Recommended only for draft quality work. Apart from a few 180 nozzles/channel printers that are still sold by Epson (e.g. Stylus Pro 3880), most Epson printers have 360–720 nozzles per color, so using this option doesn't make much sense.
- **DropletType:** while changing the *Density* setting is not recommended for proofing or photo printing, the *DropletType* and *DropletSize* parameters can improve the density without quality loss. By default, StudioRIP chooses the right droplet type and size for the current resolution. However, in some cases (such as printing on a special media) it may be desirable to use different values. The *DropletType* setting specifies the printing mode (each Epson model has

several available printing modes, each mode having a specific droplet size, in terms of picolitres, for the small, medium and large droplets). Note that only some of the listed droplet types will be available on a specific printer.

- **DropletSize:** within the current mode, StudioRIP uses one specific droplet size (small, medium or large); in addition, in VSD (Variable Sized Droplet) mode it will also use the small droplet to improve the quality of highlights. For example, on the Epson Stylus Pro series, in 720×720 dpi mode, the RIP will use VSD 2 mode with medium droplet (i.e. 12.5 pl droplets), the highlights being enhanced by the smallest available droplet type (5.9 pl). The density can be increased by choosing the large droplet (20.8 pl). Note that in non-VSD (UMD) mode only the VSD OFF mode is valid.
- **Borderless printing:** prints the image on the media without leaving the default border of a few millimeters. Some printer models may not support it, support it only partially (e.g. only horizontally), or only on certain paper sizes.
- **Drying time per scan:** the time, in seconds, that the printer waits between two head scans so that the ink can dry.
- **Drying time per page:** the time, in seconds, that the printer waits between two jobs so that the ink can dry.

#### 7.4.2 Printing on inkjet film or photosensitive material

Inkjet films or photosensitive materials need use black ink for masking the light, therefore need high ink density. On old Epson models with few nozzles our recommendation was the use of variable sized printing. However, the picture has completely changed with today's Epson printers, especially the high speed ones (SureColor T series): with the right setup, these printers are fast enough to print on decent speed even on 2880 × 2880 dpi, which places more ink than most media types would be able to handle; or, if even higher speed is desired, the use of double channel mode with 1440 × 1440 dpi places again a high quantity of ink which about the maximum amount that most media types handle. Therefore the variable sized printing is discouraged on these models (causing half printing speed and less detail).

When setting up the such system, take in account the following aspects:

- StudioRIP can print good quality halftones up to 175 lpi on the right quality media, using 2880 × 2880 dpi.
- To reach good speed on this resolution, we recommend the high speed Epson models (SureColor T series), or the use of refillable cartridges with black ink in 2 or 4 channels on the Stylus Pro models.
- Always choose minimum platen gap and low paper suction value.
- Set up the feed adjustment accurately. Note that the right value might depend on the media size too (wider media may need higher correction due to the increased friction).

- Always use density modulation, starting from 100% density on highlights, and gradually decreasing towards the density value you need for a 100% tint.
- If you use  $1440 \times 1440$  dpi, and the 100% density on a 100% tint is still not enough, use two channels together to increase density.
- If the media accepts only a small amount of ink for a 100% tint (e.g. 15-30%), using a 1 pixel outline of higher density (40-60%) may increase the dot sharpness.
- If you get moiré, try other screen frequency or angles. Below some screen sets known as being smooth and moiré free on 2880 dpi:
  - $148 \pm 1$  lpi, base angle:  $45^\circ$
  - $178 \pm 1$  lpi, base angle:  $37.5^\circ$
- The use of the *Elliptical asymmetric* dot shapes is recommended on inkjets, having the following beneficial properties for inkjet:
  - 0-30%: round dots,
  - 30-40%: the round dots turning into rhomboid,
  - 40-50%: the rhomboid dots turning into square,
  - 50%: perfect square,
  - above 50%: turning into round again, just like the Euclidean dots.
- To increase repeatability and feed accuracy, use plates in landscape mode (the extra money for wider printer may be worth for the increased quality).

### 7.4.3 Registering dead nozzles

There are situations when one or more nozzles of the printer are permanently blocked, software or hardware head cleaning operations failing to cure the problem. A blocked nozzle (even if it's blocked only partially, not placing the droplet in the right way) can seriously damage the quality of the output.

StudioRIP allows for this possibility by registering one or more nozzles as dead and then not using them at all for printing. As the microweaving system uses multiple nozzles for one scanline anyway, this will be done without any speed or quality loss. Note that this feature is not supported if the *MicroWeaving* parameter is set to *Printer based*.

The procedure for registering dead nozzles is as follows:

- Print a nozzle test page, and search for the dead nozzle(s).
- Write down the ink (e.g. Light cyan) and number of the nozzle. For example, on the sample picture nozzles #137 and #155 are dead.
- Open the *DeviceSettings.ini* file in the Print manager data folder in Notepad.

[illegible]

- Create a section called *DeadNozzles* (see example below) at the end of the file.
- Create a line with the name of the ink (C, M, Y, K, LC, LM, LK or LLK) followed by the '=' sign and the numbers of the dead nozzles separated by commas (each comma followed by a space).
- Save the file and restart *Print manager*.

In the example above, the newly added section will look like this:

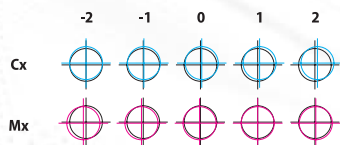
```
[DeadNozzles]
LC = 137, 155
```

#### 7.4.4 Head alignment

Epson printers may have head misregistration problems (i.e. different inks printed in slightly different position), causing blurry edges. StudioRIP can be set up to compensate for this registration error by sending the various separation planes pre-shifted in the opposite direction to the registration error, so that the result will be a perfect registration.

To align the heads of an Epson printer, follow the steps below:

- Print the *Inkjet head alignment.pdf* file from the *Proof charts* folder of the installation CD using a native (i.e. not proof) Epson job style. If the printer does not have some of the light inks, you may delete them by selecting the unnecessary plates in the *Job browser* and clicking the *Delete* button.
- Search for the best registration in each row. Note that there is a row for horizontal (X) and another one for vertical (Y) registration; look for the best registration match only on the given axis (e.g. in the *LCx* row look for the best *horizontal* registration), ignoring the misregistration on the other axis.
- In the example on the picture, the best cyan registration is in the -2 column (vertical misregistration ignored), and the best magenta registration is in the +1 column.
- Open the *DeviceSettings.ini* file in the Print manager data folder in Notepad.
- Create a section called *HeadAlignment* (see example below) to the end of the file.
- Create a line for each row with misalignment. For example, in the example above the *Cx* line needs a correction of -2, so enter the name of the line (*Cx*) followed by the '=' sign and the correction value (-2). Null corrections can be ignored (i.e. their lines can be omitted); very small correction values may also be ignored.
- Save the file and restart *Print manager*.



In the example above, the newly added section will look like:

```
[HeadAlignment]
```



CX = -2  
MX = 1



# 8 Imposition

StudioRIP has a built-in imposition system, which is able to work with pre-press marks, and is able to perform complex impositions (saddle stitching, collate and cut etc.).

StudioRIP has a post-RIP imposition system, which means that the pages are first processed, and the imposition is performed on the processed pages. This has several advantages:

- 100% certainty that a page will not be changed during the imposition (whilst with PDF/PostScript based imposition software there is no certainty that problems will not occur, due to the complexity of PDF/PostScript);
- Pages that are step and repeated over a sheet will be processed only once;
- Verifying the job during the imposition is possible, right down to pixel level, with no need to process the job again and again to check if, for example, there is a white hairline between two pages;
- Completely different jobs, with different screen settings, can be combined on the same sheet.

The only disadvantage to this approach is when jobs that have halftones right to the edge of the page (for example, a page with a 20% gray background) meet. These may have broken halftones on the touching edges of the pages. This presents problems if there will be a single cut between the pages. The only practical solution in these cases is to use two cuts between the pages.

## 8.1 UNDERSTANDING IMPOSITION

### 8.1.1 Separation, composite and imposition pages

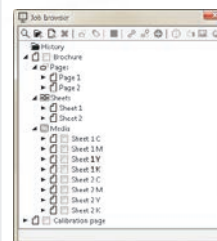
StudioRIP builds the final print in three steps:

- the separations are grouped into composite pages,
- the composite pages are arranged in imposition sheets, and
- the imposition sheets are then separated again (if needed), and placed onto the media.

The picture shows how the 8 separation pages are grouped into 2 composite pages, and the composite pages are imposed on one sheet.

StudioRIP imposition works with the composite pages of the job, the ones shown under the *Composite* node of the job browser tree. The results of the imposition are the sheets, shown under the *Imposition* node.

An imposition can only be made up from pages of the same job. To create an imposition using pages from different jobs, first combine the jobs.



### 8.1.2 Splitting jobs for imposition

If different imposition styles will be used on different pages of a job, first split the job (resulting in two jobs), then each of them can be imposed in its own style.

Here is an example: the color pages of a book will be printed on an A3 press, the black and white pages will be printed on an A2 press. Therefore, the black and white pages will have a different imposition scheme from the color pages. Select the color pages of the job (under the *Composite* node) and click the *Split job* button. The selected pages will be extracted from the job, and a new job will be created, containing these pages. The new jobs can now be imposed separately.

Use drag & drop to move pages from one job to another (this works only for separation or composite pages).

### 8.1.3 Combining jobs for imposition

To impose the pages of different jobs into one imposition, first combine them, resulting in one job containing the combined pages from the two jobs. Then impose them.

Here is an example: two A3 designs from different companies, in different files. It would be more economical to print them together on an A2 sheet. Open and process all of the files, select the job items in the *Job browser* window, then click the *Combine jobs* button in the toolbar. The imposition can then be made using the combined pages.

### 8.1.4 The imposition sheet

The imposition sheets are shown under the *Imposition* node of the job tree in the *Job browser*, each imposition sheet having its corresponding node.

An imposition sheet has a user-definable size, and contains one or more composite pages and pre-press marks. There are controls for the position and orientation of each composite page on each imposition sheet.

When a job opens, it automatically generates one sheet for each composite page. Initially there is no difference between the composite pages and the imposition sheets, they are equal in number, each imposition sheet containing only the corresponding composite page, having the same size and content as the corresponding composite page.

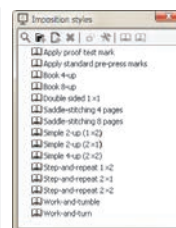
When making an imposition, the number, sizes and content of the sheets is changed. This can be done in two ways:

- Using the imposition window, which automatically performs the imposition for the standard imposition schemes, or
- Using the controls on the toolbar, which gives manual control of the positions of the pages.

## 8.2 IMPOSITION STYLES

Using the automatic imposition is the easiest way to create impositions. The automatic imposition settings can be saved for later use, and can even be applied on-the-fly, in processing time, for books or catalogs.

The imposition window manages the Imposition styles. Using this window, impositions can be added, removed or edited. By using the *Apply imposition* button, the imposition can be applied to a selected job. The *Clear Imposition* button will remove any imposition from the current job, reverting to the initial state of each composite sheet having its equivalent imposition sheet.



## 8.3 IMPOSITION PROPERTIES

When adding or editing an imposition, the *Imposition properties* window will appear. A slightly modified version of this window will appear too when clicking on the *Imposition* button on the main toolbar, or choosing the *Imposition* menu item.

With this window opened, either apply the imposition settings on the selected job using the *Apply* button, or save the settings as an imposition style (*Save* or *OK*, depending on which way the window was opened).

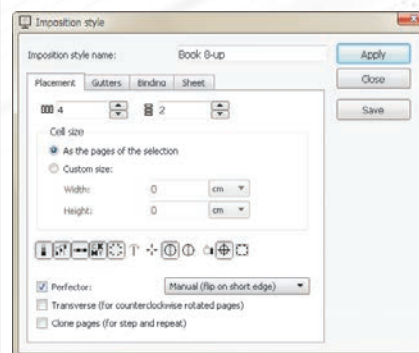
Pushing the *Apply* button, the RIP will automatically resize the sheets to fit the contents, and will apply the imposition to all the sheets of the current job.

If StudioRIP detects that the imposition scheme is wrong, the *Apply* button will be disabled, and an error message will appear under the window, explaining why the RIP considers that the settings are invalid.

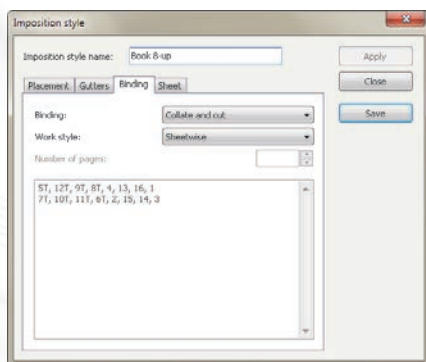
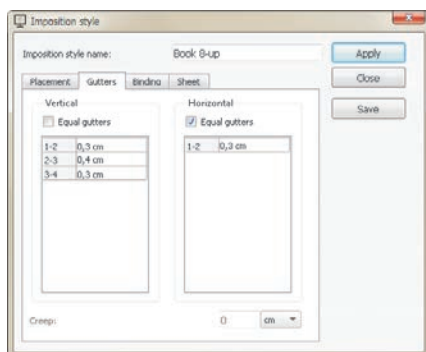
### 8.3.1 Placement tab

In the placement tab, the following options are available:

- **Number of rows and columns:** the exact number of rows and columns that will appear on the sheet, taking into account the pages doubled by the work-and-turn and work-and-tumble styles. Example: For a double-sided A4 job, which will be printed with work-and-tumble, a 1 x 2 page must be specified instead of 1 x 1.
- **Cell size:** some technologies use fixed cell sizes for impositions (for example, labels with fixed sizes). By specifying the cell size, the pages will be centered into these cells, irrespective of their size.
- **Pre-press marks:** available only if the *Prepare pre-press marks* option is checked in the job style.
- **Perfector:** is particularly important on CTP machines, where the gripper edge must fall in the same position on the plate for the two sides of double sided sheets. The effect of turning on this setting will be that the sheet content (except the pre-press marks) of the second (back) signature will be rotated by 180°, if necessary: for portrait pages turned on short







Perfect binding. Single-sided (left), sheetwise (right)



16-page collate and cut. Front (left), back (right)

edge, or for landscape pages turned on long edge. If the *Perfector* option is set, the way the pages are turned must be specified (short edge or long edge), so then the RIP can take the decision whether the back page needs to be rotated or not.

- **Transverse:** to be used only if the pages have been rotated during the interpretation (normally turned off, pages are processed in their original orientation, and rotated only when they are sent to the Print manager). Ticking this option will also rotate the imposition to match the orientation of the already rotated pages.
- **Clone pages:** Multiple copies of the same page (step and repeat).

### 8.3.2 Gutters tab

In the gutters tab, specify the horizontal and vertical gutters of an imposition. If the *Equal gutters* box is ticked, only the first gutter will be editable, and will be applied for all the gutters.

The **creep** option is useful for saddle stitching (for other binding types it will be grayed out): the more pages there are in a saddle stitched publication, the more that the inner pages move out from the binding edge compared to the outer pages (the phenomenon is known as *creep*). To compensate for the creep, the gutter is progressively increased on the pages working from the inside of the book to the outside, by the amount specified in the creep option.

### 8.3.3 Binding tab

In the *binding* box there are the following options:

- **Perfect binding:** the output is intended to be cut and collected; on single-sided works, this means that the pages are numbered simply in their natural order. On sheetwise (double-sided) works, the even and odd pages are on different sides of the sheet, and the back is numbered from right to left to match the front.
- **Saddle stitching:** it is used for publications with few pages (usually not more than 32); the pages are collected, stitched on the saddle, and then folded on the saddle; typically it is used only for 2×1 and exclusively for sheetwise schemes;

When using saddle stitching, the number of pages must be specified for the scheme to be applied.

- **Collate and cut:** is the typical imposition scheme for books; the sheet, containing 2, 4, 8 or more pages on each side, is folded consecutively on the horizontal and vertical axis until the size of one page is reached, then it is cut on the sides, except on the saddle where it is bound. It too is an exclusively sheetwise scheme.
- **Custom:** To create more complicated imposition schemes, use the *custom* option, which enables the page list for editing. Each row in the list represents a signature. The pages are numbered from left to right and from top to the bottom, the page numbers are separated with commas; a *T* after a page means a 180° rotation, *R* means a clockwise rotation, *L* means a counter clockwise rotation; a # sign before the number means absolute page number, while

the normal numbers are relative to the beginning of each signature cycle, and can be repeated to the infinite.

The work style describes the way the sheet is feed back into the print machine (if it is). There are the following options:

- **Single-sided:** the sheet goes through the print machine once, it is printed only on one side.
- **Sheetwise:** the sheet is double-sided, and has a front page on one side, and a back page on the other side.
- **Work and turn** and **work and tumble:** an old and well-used trick to save time and money. Instead of printing the front of the page, then changing the plates on the printing machine and printing the reverse page, a sheet of double size is used, each side of it containing both the front and the back. The same thing is printed on both sides of the sheet, but so arranged that each front page has the back page on the reverse side. The work-and-turn and work-and-tumble styles can be combined with binding styles: for example, a saddle-stitched job (2×1) can be printed as work-and-tumble, transforming it into a 2×2 job.

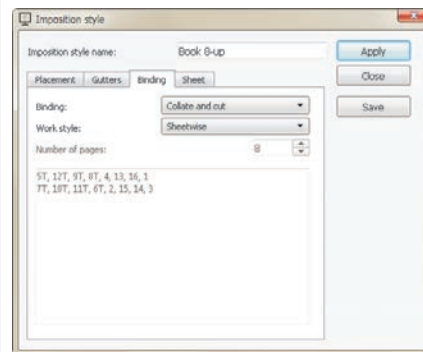
#### 8.3.4 Sheet tab

The Sheet tab controls the final size of the imposition sheet, as well as the positioning of its contents. The following options are available:

- **Automatic (fit all pages and marks):** will set the size of the sheet automatically to fit all pages and marks.
- **Custom size:** enables the operator to set the size of the sheet manually with exact width and height values.
- **Content placement:** specifies the placement of the content of the sheet with the following options:
  - **Center pages and marks:** centers the content of the sheet horizontally/vertically taking into account the marks too, if any (in other words, centering the bounding box of the entire image, including marks);
  - **Center pages:** centers the content of the sheet horizontally/vertically ignoring the marks (in other words, centering the bounding box of the pages, without the marks);
  - **Align left/right/top/bottom:** aligns the content of the sheet horizontally/vertically to the left/right/top/bottom of the sheet, ignoring the marks (based on the bounding box of the pages).
  - **Horizontal/vertical gap:** specifies the alignment gap (i.e. the distance between the bounding box of the pages and the specified edge of the sheet). For example, left alignment with 1 cm gap will place the leftmost page at 1 cm from the left edge of the sheet.



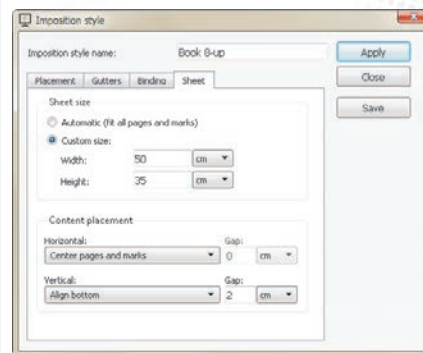
8-page saddle stitching. First sheet front and back, second sheet front and back



The previous (cut & collate) example written as a custom style



Work and tumble (for landscape pages), Work and turn (for portrait pages)





## 8.5 PRE-PRESS MARKS

StudioRIP comes with the most common pre-press marks, but other marks can be defined, or the existing ones can be changed. The following pre-defined marks are available in StudioRIP:

- Calibration bar
- Color bar
- Color names
- Crop mark (internal and external)
- Fold mark
- Job info (single and double sided)
- Registration mark
- Proof test
- Collation mark
- Side guide

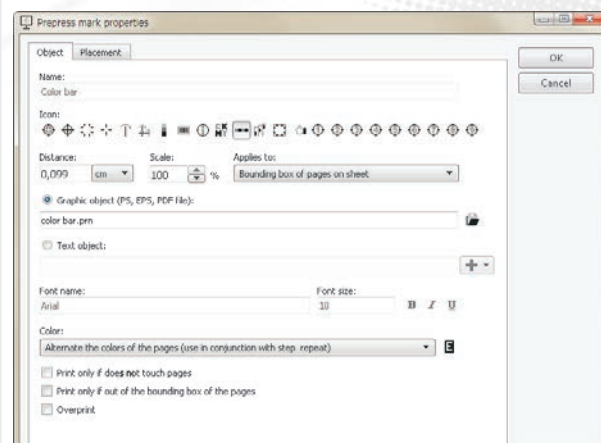
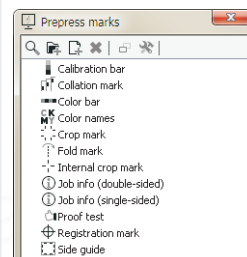
### 8.5.1 Pre-press marks manager

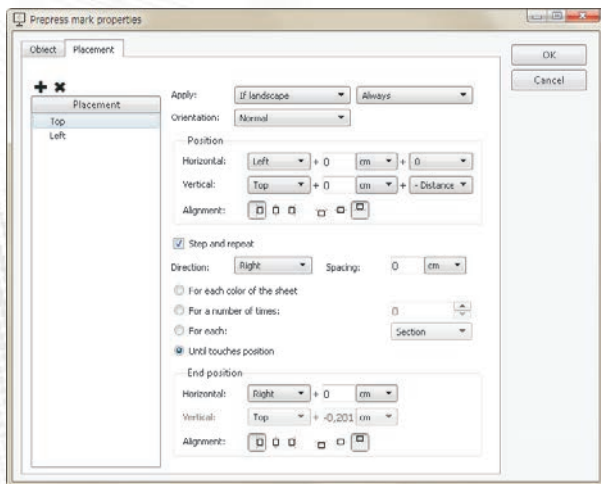
Pre-press marks can be added, removed or edited in the *Pre-press mark properties* dialog. The usual controls are also available (create copy, create folder etc.).

### 8.5.2 Pre-press mark properties

When adding or editing a pre-press mark, the *Pre-press mark properties* dialog will appear. The *Object* tab controls the global settings of the mark:

- **Name and icon:**
- **Distance:** this is a variable intended to be used in the Placement tab. It defines the relative distance of the mark from the page. This variable is used in the default prepress marks included with StudioRIP; however, but for newly defined marks it might not work well, if the distance variable is not used in the proper way.
- **Scale:** resize the mark by changing this value; 100% means the original size;
- **Applies to:** sets whether the mark will be applied to the bounding box of the pages on the sheet, to each page, or to the sheet itself;
- **Graphic object:** import a PS, EPS or PDF file, as the design for the mark;
- **Text objects:** use texts as pre-press marks, choosing the type, size and style of the font; the text can contain one or more special fields:
  - **Job name:** the name of the job, as it appears in the *Job browser*;
  - **Job style:** the name of the job style used for the job;
  - **Resolution:** the resolution, in dpi, of the job;
  - **Color name:** the name of the ink used on the current plate;





- **Angle:** the angle, in degrees, of the current plate;
  - **Line screen:** the line screen frequency, in lpi, of the job;
  - **Dot shape:** the name of the used dot shape;
  - **Plate ink area:** the painted area, in cm<sup>2</sup>, of the current page (useful for calculating the used ink).
  - **Plate count:** the number of (separated) plates in the job;
  - **Page count:** the number of (color) pages in the job;
  - **Sheet count:** the number of (imposition) sheets in the job;
  - **Long date and short date:** the date in long and short formats (e.g. "April 20, 2005" vs. "4/20/2005").
  - **Time:** the time when the job was processed.
  - **Page number(s):** the page number(s) used on the current sheet,
  - **Sheet number:** the number of the sheet, as in the *Imposition* list (i.e. the back of the first sheet is sheet #2);
  - **Side index:** 1 for even sheet numbers, 2 for odd sheet numbers; for double sided works, it is intended to mean whether it is a front or back side;
  - **Sheet index:** for double sided works, meaning the number of the physical sheet (i.e. the sheet index of the back of the first sheet is still 1, not 2, as its number is);
  - **Signature index:** the number of signature used on the current sheet; on double sided works, it is equivalent to the side index;
  - **Section index:** indicates how many times a signature has been used until the current sheet; for double sided works, it is equivalent to the sheet index;
  - **Primary distortion:** the pre-distortion, in percents, applied in fast scan direction;
  - **Secondary distortion:** the pre-distortion, in percents, applied in slow scan direction;
  - **Mirrored:** returns *Right reading* or *Wrong reading*, depending on the mirror setting of the job;
  - **Negative:** returns *Positive* or *Negative*, depending on the negative setting of the job.
- **Color:** specifies the way the color of the mark will be handled:
- **As in the file:** the mark will be placed on the sheet as-is (color or monochrome)
  - **Black, or the darkest color:** the mark will be monochrome, and the darkest color will be used (useful for crop marks),
  - **Print on each color of the page:** the mark will be monochrome, but will appear on each color (useful for registration marks),
  - **Alternate the colors:** the mark will be monochrome, and printed consecutively in each color, as it is repeated (useful for color bars),
  - Cyan, magenta, yellow and black;
- **Print only if it does not touch pages:** the mark will be printed only if it does not touch the pages (but it may touch other marks);

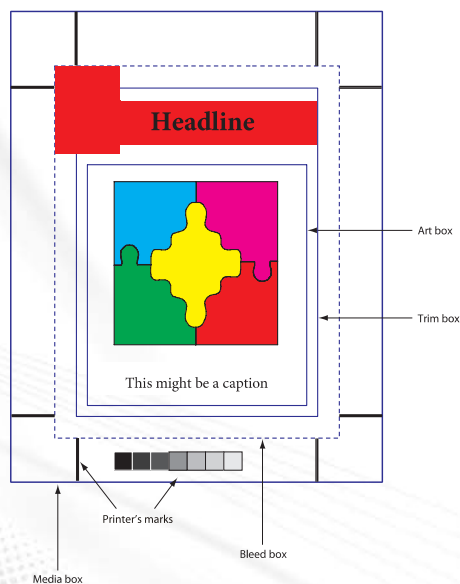


- **Print only if out of the bounding box of the pages:** the mark will be printed only if it outside the bounding box of the pages (useful for external crop marks).
- **Overprint:** overprints the mark. If not checked, the imposition module will erase the background under the entire rectangular area (technically, the page) of the pre-press mark. Recommended settings are off for color scales, but turned on for crop or fold marks.

The placement tab controls how the mark will be placed on the sheet. Marks usually have several placements (for example, a crop mark will be placed in 8 different locations, two at each corner of a page).

A new placement can be added with the *Add placement* button. Once added, assign it a name (such as *top left*), and then define it with the following parameters:

- **Apply:** specifies the conditions of this placement to be applied:
  - **Always | If portrait | If landscape:** the placement will only be applied if the orientation of the page matches the setting. This can be used, for example, to place a mark on the longer side of the page by adding two placements, one being applied only if the page is portrait (and will be placed on the left side, for example), the other one being applied only if the page is landscape (and will be placed at the top, for example).
  - **Always | If front | If back | If first signature of section | If section spine:** the placement will be only applied if the set condition is true. Front and back mean that the current signature is the front/back page of a sheet within the current imposition scheme. The first signature of section means that the current signature is the first one within the current section. The section spine means that the position falls between the first and last page of a section (which, after folding, will become the spine of the section).
- **Orientation:** the orientation of the mark in the current placement;
- **Position:** this is relative to the bounding box of the pages or to each page (depending on the setting in the *Object* tab).
  - **Horizontal** and **Vertical** position. The first pair of fields define what the mark will be positioned relative to: *Left*, *Center*, *Right* respectively *Top*, *Center*, *Bottom* are self explanatory. The *Left fold* position means the centre of the space between the current page and the previous one (where usually the fold marks are placed), similarly the *Right fold*, *Top fold* and *Bottom fold* options mean the centre of the right, top or bottom space. The second pair of fields can specify custom offsets. The last pair of fields can specify offsets using the *Distance* variable, defined in the previous tab. The use of this variable is highly recommended, because it simplifies positioning.
  - **Alignment:** Having defined the horizontal and vertical position lines of the mark (above), the *Alignment* defines how the mark will be placed relative to these lines: left, centered, right, respectively top, centered, bottom.



Artwork without bleed (left) and with bleed (right)

■ **Step and repeat:** using this option, an object can be step and repeated in the following ways:

- **For each color of the sheet** (which for a CMYK job would mean 4, for example),
- For a given **number of times** (which can be specified),
- **For each page | signature | section:** the mark is stepped once for each page, signature or section. If this option is used, there will be one (or if the placement condition isn't met, none) mark per page or sheet (depending on the *Applies to* field). After the mark reaches the end position, its position will be reset, and the mark continues to appear on subsequent pages/sheets.
- **Until touches position:** the mark will be repeated until a certain position on the page is reached;

■ **Direction and spacing:** the direction of the step and repeat can also be specified, as can the spacing between the marks;

■ **End position:** when using the *Until touches position* option, it is the position, which the mark must not touch. When using the *For each...* option, reaching this position the mark position will be reset.

## 8.6 BLEED

### 8.6.1 Understanding bleed

When a work has design elements touching the edge of the page, a special problem appears: there can be shift errors of a few tenths of millimeters (but sometimes even a few millimeters) due to inaccuracies of the printing and the cutting processes: the edge of the cut page will not fall exactly on the edge of the design elements, leaving thin white borders at the margins.

The problem is avoided by the designers using an extra area of a few millimeters around the page, as an extension of the intended design. This will offer some tolerance with the cutting precision – even if the cut falls some 1-2 millimeters from the intended place, the white border will not appear. This area is called *bleed*.

The pictures here illustrate bleed; the first without bleed, and the second with bleed.

Handling the bleed is extremely important for imposition programs. The imposition module must know where the intended trim area is (so that it can position the crop marks correctly), plus, it must be able to handle the bleed area, including it on the final print where it is necessary.

So the ability to handle the bleed does not mean that the RIP will automatically create an extension to the design – this has to be done by the designer, it means that it has to be able to work with two page sizes: the *trim box* and the *bleed/media box*.

The problem with the bleed is that the PostScript language does not have direct support for it (not even the Level 3 release), i.e. there is no standard way for a design application to create a PostScript file, containing both the *trim box* and *media/bleed box* sizes – it will contain only the

size of the page. Fortunately the newer versions of PDF have support for bleed, providing a more automated way of working with it.

The picture above shows how the different boxes are defined in the PDF file. The important one is the *trim box*, which stores the size of the intended final size of the printing; this is the box the imposition relies on.

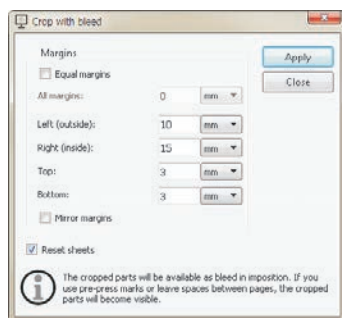
### 8.6.2 Using bleed with StudioRIP

It is very important to understand that in StudioRIP the bleed is by default invisible. This is because the size of the sheet is set to the *trim size* (i.e. the intended final size of the job), so the bleed area falls outside the sheet and is therefore invisible. The bleed becomes visible when it is on the sheet. Normally this happens in all the cases when it is needed, particularly when using pre-press marks, imposition with gutters, etc.

If there is any doubt about whether there is bleed available in a job, put the crop marks on, and compare the result to the previous picture (see [8.6.1 Understanding bleed \(page 137\)](#)).

With StudioRIP, there are three ways of working with bleed:

- The newer design applications (e.g. InDesign, Illustrator, Corel) are able to create PDFs with bleed. This means that if the designer has set up the right page size in the design, and has designed a bleed area around the page, the design application will create a PDF file which apparently (viewed in Acrobat Reader, for example) will show a bigger page than the real page size, but will contain the *trim box* information which will describe the original page borders. StudioRIP then can open this PDF file, will automatically detect the two different sizes, and will handle the bleed correctly.
- Several design applications (e.g. QuarkXPress, InDesign) offer the possibility to set up a bleed area around the page on printing, adding this extra area to the page size. This will mean that the original page size will be lost – however, specifying the same bleed size in StudioRIP, it can be re-calculated. If the design application cannot automatically create a PostScript file with bleed, a page size that is equal to the original page size plus the size of the bleed area, must be specified manually when creating the document. For example, by adding an extra 1 cm bleed area to the page size, the 1 cm bleed can be cropped back in StudioRIP, and then treated as bleed area. This can be done when the file is opened (using the *Reduction from page size* option of the *Job style* window, see [6.1.11 Post-processing task \(page 80\)](#)), or after the file is processed (using the *Crop with bleed* item of the *Imposition* menu, see [8.6.3 Using the Crop with bleed command \(page 139\)](#)).
- The third workaround is to specify the original page size on print (without bleed), and then to instruct StudioRIP's job style to expand this page size with a certain bleed area. The problem with this workaround is that several applications, such as the QuarkXPress, place the design in a clip box, so even if the bleed information exists in the PostScript file, it will be erased by the clip box. However, there are several applications which work fine with this approach (CorelDraw, for example). This can be done when the file is opened (using the *Enlarge page size* option of the *Job style* window, see [6.1.5 Sizing task \(page 70\)](#)).



### 8.6.3 Using the Crop with bleed command

The *Crop with bleed* command can be accessed from the *Imposition* menu, and it will be applied to the selected job. As its name suggests, this command cannot extend the processed area, so if bleed information does not exist in the processed data, it has no effect.

It is useful if the processed pages contain the bleed area too, and need to be cropped to the original size of the page, effectively transforming the cropped area into bleed area.

The crop will be performed on the entire processed size of the page rather than on the visible page size. This will have two consequences:

- Subsequent crop commands will not decrease the size of the page (accumulating the crop sizes),
- Specifying bleed values of 0 will remove the bleeds, reverting to the original page size.

The command will be applied to the selected job (in this case implicitly to all the composite pages), or to the selected separation or composite pages. If the **Mirror margins** option is checked, for pages with even index the **Left (outside)** value will mean the left side, the **Right (inside)** value will mean the right side, while for pages with odd page index the left and right margins will be swapped.

Having the **Equal margins** option checked, the same amount will be cropped from the left, right, top and bottom of the page, as specified in the **All margins** box.

The **Reset all sheets in job** option will re-initialize the imposition sheets before the crop operation, such that each sheet will contain one composite page, the size of the sheet being equal to the page size without the bleed. If left un-ticked, the cropped pages are displayed using the current imposition scheme.

## 8.7 EXAMPLES

### 8.7.1 Simple 2-up

Supposing two A4 pages, without bleed, which have to be put on the same A3 page.

- Print both pages, using the intended final print size (A4 in this case), as consecutive pages of the same job.
- StudioRIP will rip the jobs,
- Select the processed job in the *Job browser* window,
- Click on the *Imposition* button (on the main toolbar) or menu item, the *Imposition* style window will appear,
- Set the *Number of columns* to 2,
- Select the pre-press marks to be used,
- Press the *Apply* button,

- Check the imposition in *Imposition* view.

### 8.7.2 Step and repeat 2-up

Consider the situation above, but with only one A4 page, that – for economical printing – will be placed as two copies on an A3 sheet.

In this case perform the same steps as above, except Check the *Cloned pages* box, before pushing the *Apply* button.

### 8.7.3 Simple book 4-up with gutters

Consider a book with 240 pages of A5, without bleed, with a *collate and cut imposition* request, with 0.2 mm vertical and 0.5 mm horizontal gutters.

- Print the work on the intended final print size (A5 in this case), including all 240 pages.
- Process it in StudioRIP,
- Select the processed job in the *Job browser* window,
- Click on the *Imposition* button or menu item, the *Imposition style* window will appear,
- Set the *Number of columns* to 2, and the *Number of rows* to 2,
- Set 0.2 mm as *Vertical gutter*, and 0.5 mm as *Horizontal gutter*,
- Select *Collate and cut* in the binding box,
- Select the pre-press marks to be used,
- Press the *Apply* button,
- Check the imposition in the *Imposition* view.
- By selecting the Arrow tool (to the left of the preview window), and then selecting the sheets, two signatures will appear: the odd sheets will have the first signature (pages 5, 4, 8, 1), the even sheets will have the second signature (pages 3, 6, 2, 7).
- By selecting the Zoom tool (exiting the signature view), it is possible to see how the printed sheets will look.

5	4	3	6
8	1	2	7

### 8.7.4 Complex book imposition

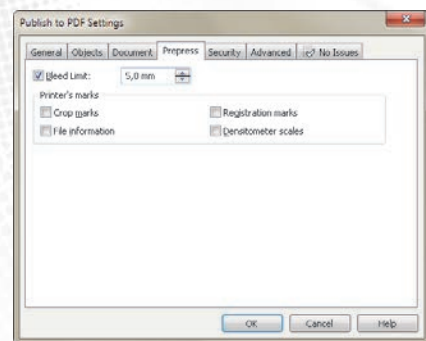
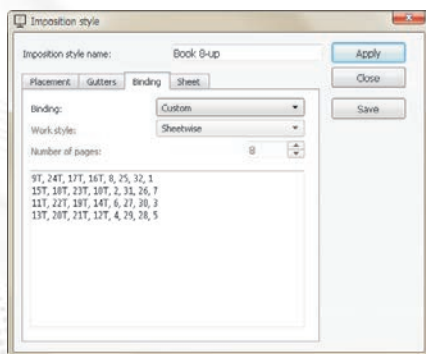
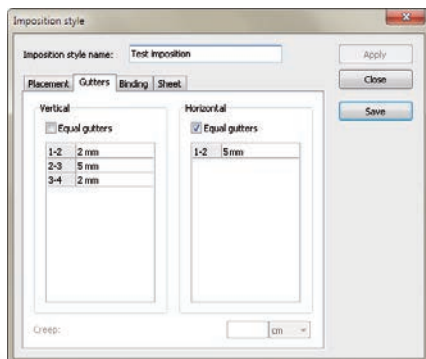
Consider an A5 book being printed on an A2 offset machine, with the following binding scheme: the double-sided A2 sheets are grouped in pairs (sheet 1 with sheet 2, sheet 3 with sheet 4, and so on), these pairs of sheets are then folded as in a simple collate and cut scheme, resulting in 32 book pages for each sheet pair. In addition, different vertical gutters will be needed: 0.5 cm in the middle, 0.2 cm for the left and the right gutters. The horizontal gutter will be 0.5 cm.

Obviously there will be 4 signatures needed, as shown in the the figure.

As there is no built-in imposition scheme for this situation, *Custom* binding will have to be used. Enter the pages of each signature in one line, ignoring the fact that the pages of the signatures are in several rows. For the pages turned upside down, a *T* has to be entered after the page number.

9	24	17	16	15	18	23	10
8	25	32	1	2	31	26	7
11	22	19	14	13	20	21	12
6	27	30	3	4	29	28	5





Not forgetting to specify 4 and 2 as the number of columns and rows. As the vertical gutters will be different, uncheck the *Equal distances* box, and fill the gutters table:

### 8.7.5 Saddle stitched magazine

Consider a magazine with 36 pages of A4, with the following binding technique: 9 double-sided A3 pages, with two A4 pages on each side, which will be collected, stitched at the saddle, and then folded.

To do this:

- From the DTP application, print the job at the intended final print size (A4 in this case).
  - Process it in StudioRIP,
  - Select the processed job in the *Job browser* window,
  - Click on the *Imposition* button or menu item, the *Imposition style* window will appear,
  - Set the *Number of columns* to 2,
  - In the *Binding* box, select *Saddle-stitching*,
  - Enter manually the number of the pages in the job, in this case 36.
- Note: This is very important!*
- Select the pre-press marks to be used,
  - Press the *Apply* button,
  - Check the imposition using the *Imposition* view.

There will be 9 signatures, each one referring to the pages by their absolute page index (i.e. #1 meaning explicitly *Page 1*, and not the first page of each signature cycle). Use the # sign before the page number each time when referring to an absolute page number, and not a page index in the signature.

### 8.7.6 Imposition with bleed using PDF files

- Set the page size in the design application (InDesign, QuarkXPress, CorelDRAW etc.) to the intended final cropped size of the page, and make the design extend beyond the defined page size by a few millimeters,
- Export the document to PDF, including in the PDF options a few millimeters of bleed (the picture below shows this setting in CorelDRAW 12):
- Open the PDF file with StudioRIP; the bleed area will be automatically detected and processed, but it will be hidden (falling outside the sheet, which by default has the size of the cropped page);
- By putting pre-press marks on the page, making an imposition with gutters, moving the page on the sheet, or performing any other operation which brings the bleed onto the sheet, without being covered by another page, the bleed will be clearly visible.

### 8.7.7 Imposition with bleed using PostScript files

- Set the page size in the design application (InDesign, QuarkXPress, CorelDRAW etc.) to the intended final cropped size of the page, and make the design extend beyond the defined page size by a few millimeters,
- If the design application is able to handle bleed on print, specify the required bleed (something like 5 mm), and print the job; otherwise, calculate the exact page size of the job with bleed (in the case of an A4 page and 5 mm bleed, this will become 220×307 instead of the original size of the A4, 210×297), and specify it in the printer's page properties,
- Open the PostScript file with StudioRIP, or – if working through StudioRIP printer or hot folder – modify the appropriate job style; in either cases using the same *Job style* dialog; check the *Imposition* task, and in the *Reduction from page size* fields enter the exact bleed value specified in the design application;
- The bleed area will be cropped from the file, with the final cropped page in the on-screen preview (the bleed area falling outside the sheet);
- Instead of specifying the bleed within the job style, it is also possible to use the *Crop with bleed...* command of the *Imposition* menu, after the job has been processed.
- By putting pre-press marks on the page, making an imposition with gutters, moving the page on the sheet, or performing any other operation which brings the bleed onto the sheet, without being covered by another page, the bleed will be clearly visible.

### 8.7.8 Imposition with bleed using PostScript files and the expand with bleed feature

- Set the page size in the design application (InDesign, CorelDRAW etc.) to the intended final cropped size of the page, and make the design extend beyond the defined page size by a few millimeters,
- On print, specify the exact crop page size of the job (so for an A4 job with 5 mm bleed, specify the exact size of the A4, without the bleed, i.e. 210×297 mm),
- Open the PostScript file with StudioRIP, or – working through StudioRIP printer or hot folder – modify the appropriate job style, in either cases using the same *Job style* dialog; check the *Sizing* task, and in the *Enlarge page by* controls specify the bleed value (5 mm, for example);
- The bleed area will be added to the file, but this will still be invisible in the on-screen preview (the bleed area falling out of the sheet);
- By putting pre-press marks on the page, making an imposition with gutters, moving the page on the sheet, or performing any other operation which brings the bleed onto the sheet, without being covered by another page, the bleed will be clearly visible.

Some applications, such as the QuarkXPress, put the printed page into a clip box. In this case this method will be ineffective, as only a white border will be added to the page as bleed.

# 9 Screening

## 9.1 BASIC CONCEPTS

Unlike the graphics displays of computers, which can electronically control the intensity of colors, most printing equipment is not able to print shades of their colorants (ink, toner etc.) directly. Offset machines, laser and inkjet printers all use screening techniques to simulate shades. None of these techniques is a perfect solution technically, all have some trade-offs and often their combination or customization is necessary for good results. But this technology is in constant development and as a result output is steadily improving.

Consequently, the screening technique is the 'soul' of a RIP: this is the part that has the most significant effect on the output quality as well as on the processing speed.

There are several ways of simulating shades, but they all rely on two basic screening techniques:

- **Traditional (Amplitude Modulation, AM)** halftones use dots in fixed positions (a grid), and vary the sizes of the dots to control the intensity of the shade;
- **Stochastic (Frequency Modulation, FM)** screens use dots of a fixed size (usually the smallest dot size which the print engine can reliably produce), but change the density of the dots (effectively, the distances between them) to control the intensity of the shade.

Traditional halftones are still the basic screening technique, because they offer two major advantages:

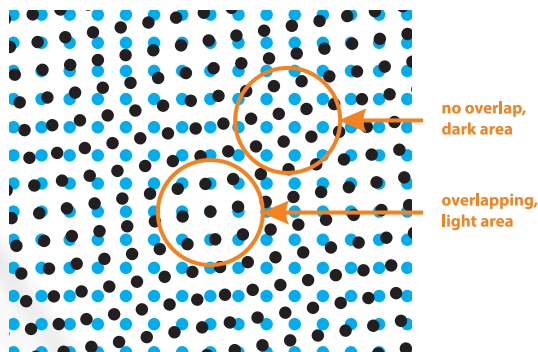
- Much better color stability in mid-tones than stochastic screens, bad printing quality affecting mostly the highlight and shadows (while the stochastic screening offers constant color stability only with good quality printing),
- A smooth look on uniform colors that stochastic screens can produce only with very fine dots.

So, even though stochastic screening has some clear advantages (eliminating the possibility of several kinds of moirés, offering good color stability in highlights and shadows, and offering smooth gradients), today's printing industry still overwhelmingly employs traditional halftones. Some RIPs, such as the StudioRIP, use hybrid screening to improve the characteristics of the traditional half tones (best of both worlds approach).

The big disadvantage of the traditional halftone is its vulnerability to different kinds of moirés, and these will be discussed in detail in the next section.

## 9.2 UNDERSTANDING MOIRÉ

Moiré is a phenomenon recognized by many people but understood by few. Experienced typographers or engineers have often vague and erroneous ideas of exactly why moiré appears.



The moiré appears when two repetitive patterns are interfering, creating a third (much larger and therefore more visible) pattern with altering lighter and darker areas. The effect of lightness or darkness is caused by physically less (or more) ink surface on the media. In the case of moiré between halftone screens, lightness is caused by overlapping dots (i.e. covering less media), darkness is caused by the lack of overlap (i.e. covering the most possible media).

Unfortunately in the printing industry grids and rasters are very common, so there are many opportunities for the moiré to occur. The most important ones are:

- Interference between halftone screens,
- Interference between a halftone screen and a raster device,
- Interference between a halftone screen and image elements.

### 9.2.1 Traditional offset angles

The traditional printing uses 15, 45 and 75 degrees for the cyan, black and magenta screens, and 0 (sometimes 30) degrees for the yellow screen. To understand why these angles were chosen, there are a few issues to clarify.

- Why the halftone screens have to be placed at different angles?
  - Anyone who has seen two overlapped halftone films on a light table knows that on certain angles the moiré phenomenon becomes visible (the cause of moiré explained above), on others it disappears. Strictly speaking, the moiré never disappears, but rather becomes so fine that the human eye doesn't perceive it as an unpleasant pattern (typically in the 30-60° range).
  - The angle of zero degrees between two halftone screens is a special case: as long as the angle is precisely zero, there is no moiré. However, slight rotation can cause moiré, and a slight shift can cause enormous color changes. This is a huge risk for the printer and needs to be eliminated. In conclusion, angle sets must be found that will minimize the risk of moiré or color changes caused by the shifts or rotations of the planes.
- Does the ink color influence the moiré?
  - Pure cyan, magenta and yellow are independent colors in the color spectrum, they should not interfere with each other: the cyan filters exclusively the red light, the magenta the green light and the yellow the blue light. However, the inks used in offset printing are imperfect, especially the offset cyan, which is very far from pure cyan (also filtering a good part of the green light), and the magenta is very imperfect too. So in practice there will be an interaction between the cyan, magenta and yellow inks, caused by their overlapping filtering characteristics.
  - The black ink – which has to be used for a number of reasons – has a filtering curve that overlaps all other inks, so it interacts with any other ink;



□ In conclusion, the strongest moiré phenomenon occurs between the black and other inks. Also, there is a strong moiré between cyan and magenta. However, the yellow-cyan and yellow-magenta combinations have relatively little (although still visible) interaction.

■ Why exactly these angles?

- By positioning the halftone screens with 30 degrees between them, moiré is minimized, producing the so-called *rosette pattern*;
- However, only 3 screens can be placed this way, because the fourth would be placed at 90 degrees from the first one, which means, in practice, that they will have the same angle;
- The yellow angle will be placed between the cyan and magenta angles, thus producing a slightly visible moiré with these two colors (but producing only a rosette pattern with the black screen).
- The black, as the strongest color, is placed at 45 degrees, because this is the most pleasing angle for the human eye.

### 9.2.2 The moiré between the cyan, magenta and black screens

Having exactly 30 degrees between the cyan, magenta and black screens produces a moiré called *rosette pattern*. Even if *de facto* this is moiré, it is so fine and pleasant to the human eye that printers do not consider it as being a moiré.

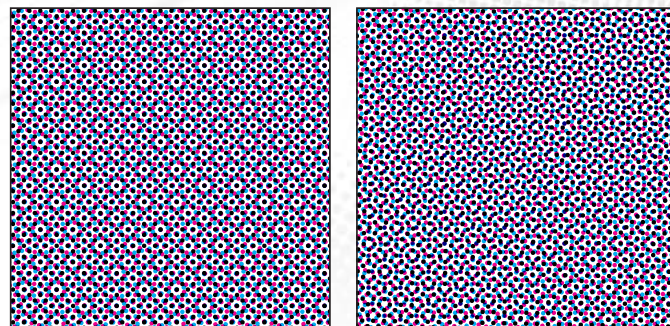
**However, small angle or frequency differences in the traditional angle scheme can cause very disturbing moiré patterns.**

On the left picture there is a good rosette, on the right picture there is a flawed rosette. While the good rosette looks the same on the whole printing area, the flawed rosette is changing its structure across the printing area, causing shade differences and therefore moiré.

Older RIPs are often unable to produce accurate angles and frequencies, causing moirés for certain color combinations, especially when the color separation is made with a high black generation. The picture here is a typical 'dangerous' combination for old rips, containing the same percentage of cyan, magenta and black.

Modern RIPs are all able to produce relatively accurate screens, so the moiré between the cyan, magenta and black is usually impossible: using any CMK color combinations; the pleasant rosette pattern will appear instead of moiré.

**Even some of the latest RIPs are unable to achieve the high accuracy needed to avoid problems. This happens particularly in adverse conditions like flexo angles, high line screen or low resolution.**



When the necessary accuracy is not achieved, the effect is that the same color has different shades in different corners of the sheet, or, in certain cases, the moiré pattern can be visible on the page.

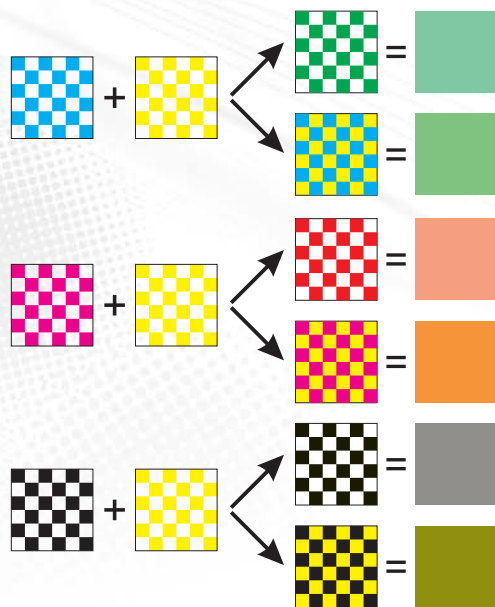
### 9.2.3 The moiré between the yellow and other inks

The yellow ink causes trouble even with the latest RIPs. The moiré caused by the yellow ink is suppressed, and usually hardly visible for the human eye, but sometimes it becomes visible.

As the yellow is between two other inks (cyan and magenta in the traditional printing), it causes a regular moiré pattern with the two neighboring colors. This moiré pattern is clearly visible on films when placed on the light table, respectively, between the yellow and cyan, and the yellow and magenta films.

On the final print this moiré is usually almost invisible (or at least much less visible than on the films) because the cyan, magenta and yellow are relatively independent colors (the overlap between their filtering characteristics is relatively small), so in practice it is only the imperfection of the inks that are causing the moiré. The first two pictures below illustrate that there is no big difference between the two extremes of the moiré in the C+Y and M+Y moirés. The moiré is oscillating between the two extremes – a light and yellowish green, or a light and yellowish pink –, but as the two extremes are almost the same, so resulting moiré won't be very obvious.

These differences can be very slight but are sometimes visible, so there are various techniques used to suppress or avoid this moiré:



- The frequency of the yellow is increased by approximately 12%; this reduces the moiré period (making it finer and so less visible), having the same effect as increasing the yellow's angle compared with its two neighbors (unfortunately a practical impossibility);
- Using elliptic dots will reduce the contact surface of the dots, minimizing the differences between the two extreme colors;
- Using higher line screens generally reduces the visibility of the moiré;
- For skin tones, the yellow is placed between the cyan and black, avoiding completely the M+Y moiré (which is often visible on skin colors with the traditional angles), replacing it with the Y+K moiré.

As the last picture above shows, of the color combinations that create the most noticeable moiré the worst is the Y+K moiré. Usually this is a rare combination, and the CMYK colors generated by the color separation profiles are not vulnerable to this effect. However, manually specified CMYK colors with strong K components may cause moiré when using the skin optimized angle scheme.

In conclusion, we recommend using the skin optimized angle scheme for works with large skin surfaces, as well as for general use, but be aware of the dangers and change to standard yellow angles when necessary.

Using skin optimized screen set may cause a strong moiré between the black and yellow inks.

#### 9.2.4 The moiré between a halftone screen and a raster device

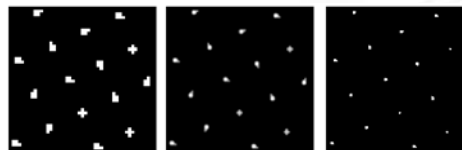
This moiré is caused by the interference between the halftone raster (e.g. 170 lpi) and the device raster (e.g. 2400 dpi). When this moiré occurs, it is visible on individual colors (especially visible on films, in the dark areas, when viewed on a light table). Typically the cyan or magenta screens have lines or other patterns in the 80-95% shades.

This phenomenon is exclusively caused by the dot gain of the imagesetter, platesetter or other printing equipment. If the whole printing chain could keep the pixels as sharp squares, the moiré would not appear.

To examine how this phenomenon occurs, we will consider the case of a typical imagesetter with a dot size of 20 microns at 2400 dpi. This dot size is twice as big as it should be (mathematically) for that resolution, and causes the dot distortion shown in the illustration below. The first picture shows how the RIP makes halftone dots of 5 white pixels each (so mathematically their area is the same). Once this pattern is imaged, using the oversized laser (which may not be perfectly focused), the sharp white dots become blurred, and the black runs into the white. Film designed for imagesetters typically has a very high gamma; the result is sharp dots of different sizes.

Unfortunately, for statistical reasons, the dots tend to be grouped in groups of bigger and smaller dots, and this causes the moiré effect. The dark areas are especially vulnerable, but on poor quality screen sets it can also appear in mid-tones.

As this problem does not occur on high quality print engines (such as drum imagesetters, where the dot is perfectly focused and is the right size), some RIPs, designed for such print engines, can afford to ignore this problem.



On capstan devices, a good RIP is necessary – one that provides pattern free screens even with high dot gain.

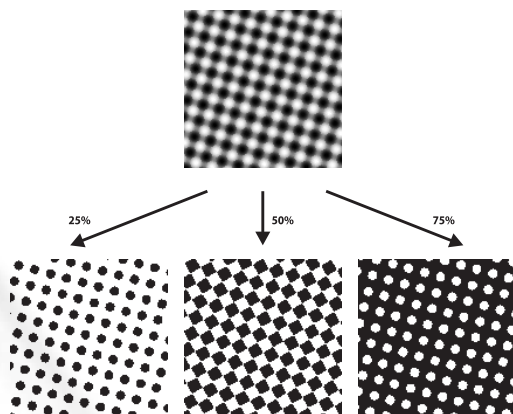
#### 9.2.5 The moiré between the halftone screen and image elements

If there are repetitive image elements in a job (radiator of a car, texture of a jacket, window blinds, etc.), they may produce a moiré with the halftone screen.

This is the typical situation where the stochastic screen comes into its own, because it is absolutely immune to any kind of moiré.

### 9.3 UNDERSTANDING DIGITAL HALFTONES

Digitally created halftones have some specific problems, caused by the fact that they are made by a raster device.



### 9.3.1 Threshold maps

Most digital halftone systems use a threshold map (halftone map) for generating halftone screens. The picture below shows a threshold map (a grayscale bitmap), converted into halftoned black and white bitmaps. The conversion is similar to the usual grayscale to black and white conversions, but uses the target gray value as the threshold level of the conversion.

If a grayscale bitmap (typically 300 dpi) is to be converted to halftoned monochrome bitmap (typically 2400 dpi), each of its gray pixels is treated as gray squares of  $8 \times 8$  device pixels (assuming the resolutions above).

As the halftone map must match the resolution of the device, the threshold map covering the entire page would occupy a few gigabytes, even for an average imagesetter or platesetter. Just storing this sort of information would be a problem, not to mention the time needed to generate it. So the halftone map is tiled.

A tile for an obliquely angled halftone consists in two squares; the tangent of the side ratio gives the tiling angle, and this is equal to the ratio of the sides of the two squares.

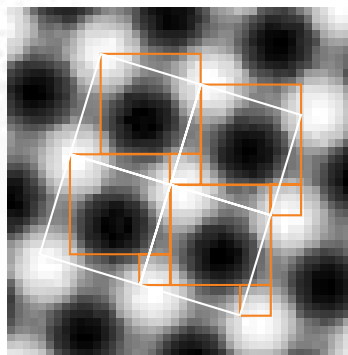
By storing two bitmaps (corresponding to the two straight squares on the picture) allows the RIP to reproduce the whole halftone map by tiling (see the oblique rectangles). Because they are bitmaps, their sides have an entire number of pixels, typically 0-20 pixels.

### 9.3.2 Angle inaccuracy

It is a simple mathematical fact that with three angles required, with 30 degrees between them, at least one will result in an irrational ratio between the sides of the squares. For example, to produce a 30-degree halftone, the ratio between the sides should be  $\tan(30)$ , which is an irrational number (i.e. cannot be a ratio of two integers). In other words, with this tiling technique, an angle of exactly 30 degrees cannot be achieved. Similar problems occur for each different screen frequency at given angle.

This phenomenon will cause moiré between the colors: as the sides of the squares have to be whole numbers, and therefore have to be rounded up or down, the resulting screen angles and frequencies are only rough approximations, with the result that they are vulnerable to moiré.

In the late 80's the rip manufacturers searched for angle combinations that minimized this moiré effect. At the same time, low black generation became an industry standard when performing color separations: the black was used only for dark colors, lowering the likelihood of producing moiré with the other colors.



### 9.3.3 Supercells

The breakthrough came at the beginning of the 90s, when a few RIP developers succeeded in dramatically improving the quality of digital halftones by using supercells. This technique soon became an industry standard, and most of today's RIPs are using their own version of this techniques to produce moiré free halftones.

However, the problem was still far from solved. A quote from the user manual of one of the world's leading RIPs shows that problems still exist: "If you find that you are not getting consistent dot or clear-centered rosettes across the full width of the page: try varying the requested fre-



quency slightly, or increase *Maximum frequency deviation* to allow Express RIP to find a screen set with better angle and frequency accuracy.”

The main source of problems is that these supercell techniques are usually trying to approximate irrational numbers with rational ones, but the result is still just an approximation (though there are exceptions too, see later). The moiré effect is usually not completely erased, it is just pushed outside the page – but sometimes this fails, and the moiré remains on the page. This may mean a visible moiré pattern (see the quote above), but usually it just means inconsistent rosettes (causing color variation within the page).

Theoretically the use of large supercells would solve this problem, as increasing the size of the supercell would increase the accuracy of the angles. However, large supercells raise not just speed problems (generating and using large supercells may be slow), but will also increase the likelihood of patterning (see below).

#### 9.3.4 Patterning of individual colors

Quote from the same user manual: “Decreasing the *Angle accuracy* or *Frequency accuracy* settings [...] also gives Express RIP more freedom in selecting a screen, and may produce patterning on individual films, but this may also *increase* the likelihood of *moiré* effects between plates”.

The “patterning on individual films” term above is referring to the moiré effect described in chapter [9.2.4 The moiré between a halftone screen and a raster device \(page 148\)](#). The quote shows that the problem still exists and is quite serious.

One approach to correct this problem would be to use dots of the same shape, but this would move the ‘center of gravity’ of the dots from their mathematically ideal place, and the human eye seems to be very sensitive to this.

Another approach would be to anticipate the distortions and apply a pre-distortion to the dots; in theory the resulting dots would have the correct size on the final print. However, we consider this approach too dangerous, as the immediate result of any technological problems (causing different distortions than expected) would be the appearance of patterning.

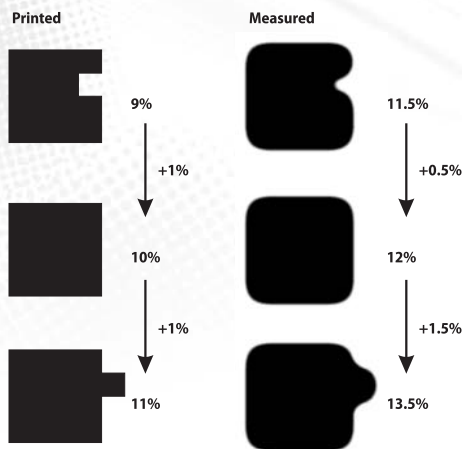
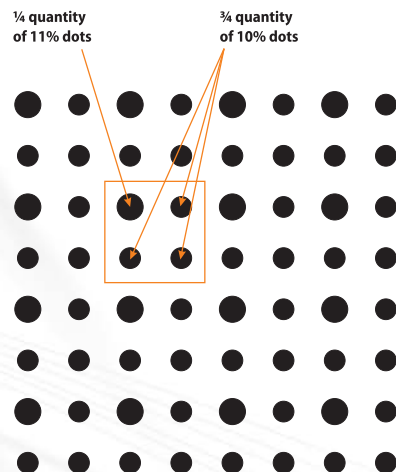
The solution, adopted by the majority of the RIP manufactures, is to only use certain, well-tested screen sets, which fortunately are not vulnerable to this moiré phenomenon (because the dots are well dispersed). It imposes limitations and is an area where improvements are needed. StudioRIP’s advanced screening techniques succeeded in making these improvements.

#### 9.3.5 Limited number of shades

Another well-known problem of digital halftones is that the number of shades on a given device resolution is limited by the possible sizes of a halftone dot. This is expressed as:

$$\text{number of shades} = \left( \frac{\text{device resolution}}{\text{screen frequency}} \right)^2 + 1$$





For the typical 170 lpi @ 2400 dpi, this means 200 shades, for lower device resolutions or higher screen frequencies this could be even less. However, to achieve a smooth gradient, at least 1000 shades are needed.

The answer to this problem arrived together with the supercell technology (which also solved the moiré problem), and became the current *de facto* industry standard. If the possible sizes of the halftone dots are very limited (due to high line screen on low resolution) – for example, there is no intermediate dot size between 10% and 11% –, an intermediary shade of 10.25% can be achieved by using 10% for three quarters of the dots and 11% for the other quarter of the dots, distributed evenly.

This technique was a breakthrough in its time, because this was the main obstacle to using high screen frequencies. With this technology, line screen frequencies of 180-200 lpi can easily be reached at 2400 dpi without losing shades, when previously these frequencies were restricted to higher resolution machines.

### 9.3.6 Poor highlight and shadow quality

The problem of poor highlight and shadow quality is another problem for traditional halftones, because most print engines have problems handling small dots. When the size of the black or white dot falls below a critical value, the technology will be unable to reproduce it (the dot will be lost on the film, plate or paper).

Some RIP manufacturers are unable to find solutions for this problem, but most RIP manufacturers overcome this problem by using the gray enhancement technique (presented in the previous chapter) so that in the highlights the smaller dot will become zero (that is, a missing dot), for example achieving 1% shade using 0% and 4% dots.

The problem with this approach is that if the range of shades to achieve is high (for example, the minimum dot size the print engine is able to reproduce is 8%, so the 0-8% range has to be achieved by the gray enhancement technique), a big supercell has to be used, and therefore an offensive pattern will appear if the dots are ordered.

The innovation of the technique StudioRIP uses to avoid this problem is that instead of using an ordered pattern (as the one presented in the picture), a stochastic approach is used, avoiding any disturbing patterns.

### 9.3.7 Tonal jumps

Finally, there is the problem of tonal jumps. This is caused by the distortions of the print engine: the intended (mathematically computed) and the real (measured on the film) sizes of the dots are not in a linear relationship. Adding one pixel can increase more or less the real size of a halftone dot, depending on the current shape of the dot, and the position of the newly added pixel. A pixel, which should add 1% to a halftone dot, can sometimes add only 0.3% on the film, at other times the same pixel added to another halftone dot, in a different position, can add 2-3%. This phenomenon can be amplified by the dot gain on the paper.

A very strong tonal jump can occur at 50% when using the Euclidean dot shape: approaching

50%, the dots should have square shape, and as the dot percentage increases, the corners of the dots will come into contact with each other. The dot gain will distort the linearity of shades where the dots are in contact with each other, producing a jump when the corners are close enough. The human eye will easily perceive this non-linearity of the gradient.

Many RIPs do not offer a solution to this problem. StudioRIP uses a low-pass filtering technique to avoid the tonal jumps.

## 9.4 UNDERSTANDING STOCHASTIC SCREENING

Stochastic screening is also known as FM (Frequency Modulated) screening. It uses a fixed dot size (usually the smallest size that the printing equipment can consistently produce), but varies the density of the dot pattern to achieve the desired shades. Technically, the frequency of the dots is modulated in proportion to the intensity of the shade being reproduced.

### 9.4.1 Advantages

Using FM screening has a number of advantages compared to the AM screening:

- All moiré is eliminated (especially the moiré between the image elements and the halftone screen, as well as the moiré between the colors).
- Under a dot size of 40  $\mu$ , the dots will become practically invisible for the human eye, but can be still safely reproduced by an offset machine.
- The image generally becomes sharper.
- This technique suits certain devices (like inkjet printers, which do not have a fine control over the size of the dot, but can safely reproduce a given, fixed dot size) much better. They can achieve better image quality by frequency modulating a constant dot size.
- Print technologies like the flexography or serigraphy have additional moiré problems with AM screening. FM screening resolves these problems too.

### 9.4.2 Disadvantages

FM screening is still little used in the field. This is explained by the following disadvantages:

- In the case of AM screening, poor printing quality affects only highlights and shadows. With FM screening it affects the whole tonal range.
- Uniform colors have a noisy (grainy) appearance as compared with AM screening.
- Using imagesetters, the small dots used by the stochastic screens are easily lost when transferred to the plate (using CTP systems, however, the dots are safely reproduced on the plate).
- Advanced AM screening technologies (combined with stochastic highlight/shadow protection) enable the use of line screens of 200-300 lpi on offset machines, offering better and more consistent results than the equivalent FM screening.

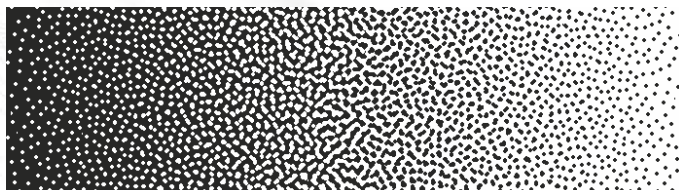


#### 9.4.3 First order FM screening

The first order FM screening, inspired by the Floyd-Steinberg algorithm, builds a threshold map by placing the pixels to present a smooth, dispersed look. The obtained threshold map is then magnified to reach the needed dot size (typically using dots of  $2 \times 2$ ,  $3 \times 3$  or  $4 \times 4$  pixels by 2, 3 or 4 times magnification).

This technique has a number of disadvantages:

- The dots are squares rather than circles (inevitably distorted by the offset machines).
- The dots can be placed only at certain positions (using  $2 \times 2$  pixel dots, for example, the dots can have only even coordinates). This ordered placement will cause moiré on slight registration errors.
- The so-called 'chessboard' effect will appear near 50%, which will cause local plugging, and therefore unstable and noisy tints.



#### 9.4.4 Second order FM screening

Second order FM screening techniques try to overcome the problems mentioned above. There are several different second order techniques used by RIPs, but their common characteristics are as follows:

- The dots are freely placed (avoiding moiré on registration errors).
- Typically, over 20%, the size of the dots will be grown rather than adding more dots to increase dot density.
- The chessboard effect is avoided, usually, by the so-called clustering effect.

The major improvement of the second order FM screening techniques is in their abilities to produce shapes which can be well reproduced by the print engines (rounded, thick, robust shapes rather than angular, thin, fragile ones), but at the same time offering a smooth, pleasant look.

### 9.5 STUDIO RIP AM SCREENING TECHNIQUE

The AM (amplitude modulated) screening is the traditional halftone technique, which uses a fixed grid of dots, changing their size in order to achieve the desired shades (which technically means that the amplitude of the dots is modulated with the intensity of the shade).

From the outset, our objective was that StudioRIP's AM screening technique had to comprehensively and effectively overcome the problems described in the previous chapters. When designing StudioRIP's screening technique, the following clear goals were set:

- Consistent rosettes to be achieved, even on large pages and high line screens,
- Freedom for the user to choose angles and frequencies,

- Imperceptible patterning to the human eye, even on low quality print engines,
- 4096 shades of gray for practically any line screens,
- Good color stability in highlights and shadows, even on low quality print engines,
- Perfectly smooth gradients,
- Very high rendering speed.

### 9.5.1 High rendering speed

High rendering speed demands that the fastest technique possible is used. This meant halftone map supercells supercells had to be used with a fully optimized algorithm. Rasterizing bitmaps or vector objects can be done without complex mathematical operations: the resulting halftone is already computed and is available in memory – it just has to be tiled. This approach offers the possibility of rasterizing full-page bitmaps in tenths of a second.

While halftone map based RIPs have the limitation that a darker tint always has just extra pixels compared to a lighter tint, StudioRIP has a unique feature: the ability to use several halftone maps together, this way overcoming this limitation. This technique allows StudioRIP to have the ink density modulation built into the screening and rendering system, where darker halftones have less ink density and therefore removed pixels compared to lighter tints.

### 9.5.2 Consistent rosettes

The main problem of the supercell technique is that to achieve the angle and frequency accuracy that offers consistent rosettes over large pages, huge supercells are necessary. However, huge supercells mean much slower speeds, high memory needs, and vulnerability to patterning.

With this in mind, RIP designers usually try to find 'lucky' screen sets, ones which offer good accuracy with relatively small supercells (usually less than  $20 \times 20$ , but not more than  $50 \times 50$  halftone dots). Unfortunately there are very few of these screen sets, and most are not very good. So, in most cases these RIPs are either using very few 'recommended' screen sets, or – in cases where there are many screen sets offered – the quality is inconsistent throughout the set (or certain screens are selectively recommended only for specific print engines).

StudioRIP takes a different approach: it has proven that perfect rosette can be produced not just by the traditional angle scheme, but by angles and frequencies that deviate slightly from it. From this point of view, searching for an accurate approximation of each of the angles is not the ideal approach: the search should be oriented to finding values that *together* produce accurate rosettes instead.

StudioRIP developed a formula for this; it calculates the consistency of the rosettes for deviated frequencies. Using this formula, and surrendering the obsessive requirement to find accurate approximations for each of the angles, dozens of screen sets with perfectly consistent rosettes can be found for each line screen frequency.

### 9.5.3 Filtering out the patterning

Having many available moiré free screen sets is very useful, because it will be needed to address





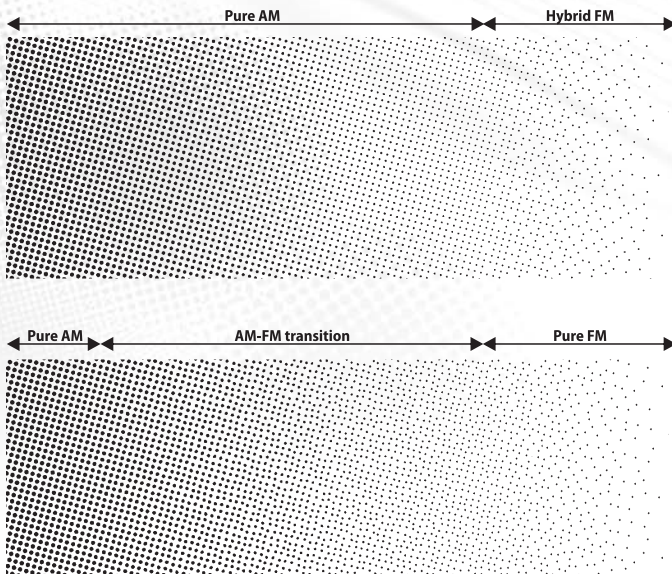
the problem of patterning (presented in the previous sections [9.2.3 on page 147](#) and [9.3.4 on page 150](#)). That is because the approach StudioRIP screening takes to overcome this is based on the empirical observation that some screen sets seem to have ‘immunity’ to this patterning phenomenon. Analysis revealed that on some angles the dots of different shapes are distributed evenly, and then there are no visible groups of bigger or smaller dots.

In the practice, this means that the possible screen sets will have to be filtered, in order to avoid patterning on individual films: a considerable part of the available screens will be disregarded (because they are dangerously prone to patterning). However, given the large number of available screen sets, there will be perfect quality screen sets even after the filtering process, giving to StudioRIP users the freedom to choose accurate dots for their needs.

#### 9.5.4 Gray enhancement

Gray enhancement overcomes the problem of the limited number of gray shades. StudioRIP relies on supercell technology for its gray enhancement. The novelty of StudioRIP’s technology is that it uses large supercells with stochastic patterns rather than small supercells with regular patterns. This means that there will be no disturbing patterns in the grays even on very high line screens – the stochastic technique will always offer a smooth look.

StudioRIP’s gray enhancement eliminates the need to apply a typical workaround for the limited gray levels problem: using high resolutions. Line screens of up to 300 lpi can easily be achieved on 2400 dpi without losing shades. Moreover, on high quality drum machines, line screens of 150-180 lpi can be used safely even on low resolutions such as 1200 or 1800, and gradients will still look smooth and perfect.



#### 9.5.5 Great highlight and shadow detail

StudioRIP achieved greater highlight and shadow detail by using a hybrid technique: in the extreme shades, StudioRIP combines FM technology with the AM screens. The minimum dot size that the RIP can produce is set within the controls. If the requested dot percentage falls below the specified limit (for example 4%, as on the picture below), instead of reducing the dot size, the dots are stochastically removed (the pattern is thinned).

StudioRIP’s hybrid screening is probably the best technique available because it is stochastic, and therefore produces a pleasant and smooth look. Regulated patterns used by many other RIP solutions offer a much less pleasing look.

#### 9.5.6 Increased highlight quality for flexo

Reproducing highlights is a key problem in flexography, as there is often huge dot gain in this area (typically 2% will print as 10-15%). Therefore having good color depth and pattern free halftones in this area is critical.

The standard StudioRIP hybrid screening, as presented in the previous section, offers the desired color depth, but even though it is stochastic, the FM part isn’t entirely pattern free. This isn’t a problem in offset, where the hybrid screening protects only the highlights under 2-3%.



and the slight pattern is practically invisible. However, with the huge dot gain of flexo, it may become visible and offensive.

Therefore SGSS (Second Generation StudioRIP Screening) offers a hybrid screening optimized for flexo, increasing the quality of the FM part at the expense of slightly decreased quality in the AM part. Using a principle that allows the centers of the halftone dots to slowly drift away when the percentage falls below a given level (typically 30-35%), reaching an entirely stochastic structure at 3-5%. Removing dots from this stochastic grid will become practically imperceptible, thus visible patterns will disappear almost entirely.

### 9.5.7 Low-pass filtering of the tonal jumps

The tonal jumps (described in chapter 9.3.7 on page 151) are smoothed by StudioRIP using a low pass filtering technique: for example, to achieve a 50% tint, the rip uses 48, 49, 50, 51 and 52% dots, distributed stochastically. The bandwidth of the filter can be explicitly specified. A wider filter will cause smoother gradients, but also noisier tints.

Using low-pass filtering is especially important on old capstan machines or any other devices with high dot gain. The noise introduced by a filter bandwidth of 2-4% is imperceptible, while the improvements are spectacular.

This technique also smoothes out the abrupt change in density caused when halftone dots start to touch – there is no need to use elliptic dots to distribute the shock, the low-pass filtering distributes it well.

### 9.5.8 Other advantages of the stochastic technique

Finally, the use of these stochastic techniques has a few other advantages. For example, on print engines that have banding or other similar problems (such as many capstan imagesetters with vibration problems, or drum imagesetters with carriage rail problems), the problem can be masked by the careful use of slight stochastic noise over the raster.

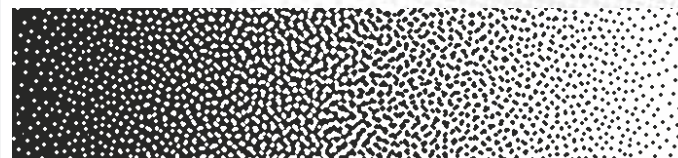
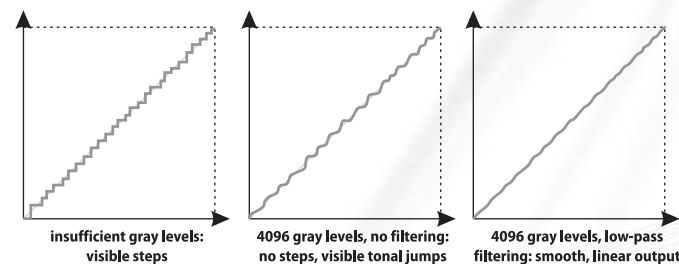
## 9.6 STUDIO RIP FM SCREENING TECHNIQUE

### 9.6.1 Second order stochastic screening

StudioRIP uses a second order stochastic (FM) screening technique. This technique is optimized for the press industry, and is less suitable for inkjet printers. The power of this screening technique relies on round or rounded dot shapes which are generated by high resolution digital devices like CTPs or imagesetters, and then are easily reproduced by analog technologies like off-set printing, flexography or serigraphy.

### 9.6.2 High rendering speed

StudioRIP uses exactly the same threshold map based technology for FM screening that it uses for AM screening, so it can offer the same very high speed as it does for traditional halftoning.



### 9.6.3 Moiré free screening

The stochastic screen of StudioRIP overcomes all the possible moiré effects, including:

- moiré between image elements and screen,
- moiré between different inks,
- moiré between the edges of the dots (see the [9.4.3 First order FM screening <page 153>](#)).

Instead of moiré, a noise will appear on overprinted inks. Using small dot sizes, this noise will be fine enough to be imperceptible and pleasant to the human eye.

### 9.6.4 Smooth look

A special filtering technique enables StudioRIP to produce very smooth tints with FM screening, suppressing considerably the specific blue noise of stochastic techniques. Individual films (and therefore the stand-alone colors) will be almost as smooth as with the traditional halftoning, and the noise will only appear on overprinted inks (in other words, mixed colors).

### 9.6.5 Round and rounded dots

Unlike many other stochastic screening technologies which typically use squares, the stochastic screening of StudioRIP produces real round dots (if a minimum of  $3 \times 3$  pixel dot grid is used), and it also optimizes the dot placement to form, when possible, rounded shapes without sharp angular corners or thin lines.

In order for StudioRIP to achieve very smooth dot shapes, the recommendation is to work on high resolution to allow the RIP to use at least  $4 \times 4$  pixel dots. However, even if dots of  $2 \times 2$  pixels have a square shape, they still produce rounded clusters with a pleasant look.

### 9.6.6 Different black and white dot size

A unique feature of StudioRIP's stochastic technique is the ability to use different dot sizes in the highlights and shadows. This is useful because the dot gain of the CTP, imagesetter or press usually increases the size of the dots in the highlights, and reduces the size of the dots in the shadows (which, in extreme cases, causes the plugging effect). Using bigger dots in the shadows than in the highlights enables StudioRIP to achieve the same black and white dot size on the final printing.

### 9.6.7 Flexibility

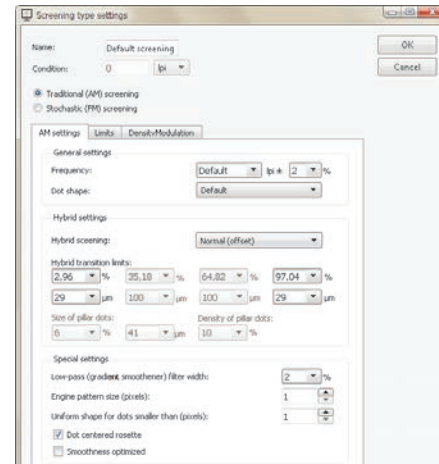
Another unique feature is that StudioRIP lets the user optimize the stochastic dot for the specific needs of the intended output technology (see [9.7.2 FM settings tab <page 161>](#)). The resulting screen can be easily tested (see [9.8 Test screen window <page 163>](#)).

## 9.7 SCREENING TYPE SETTINGS

The default StudioRIP screening parameters are optimized for generic offset use, so most users will have to specify only the line screen frequency. However, using the *Screening type settings* dialog it is possible to fine tune the screening for the special needs of each printing technology or each job.

The following settings are available:

- **Name:** the name of the screening type, as listed in the *Screening type* list of the *Screening* task in the *Job style* window.
- **Condition:** this is the key setting for using multiple screen types per page. A line screen frequency or angle can be assigned for each screening type, the given screening type being used if the line screen or angle of the given object matches the specified usage condition. There is always a default line screen, in which the usage condition box is grayed out. By specifying in the DTP application either a specific line frequency or angle for certain objects, these values can be filtered by StudioRIP and can trigger the use of a different screening type. See more in [6.1.10 Screening task \(page 77\)](#). Typical usage:
  - Define a second type of screening (for example FM), and define 100 lpi as its usage condition. In the *Screening* task you'll see two screening types in the list, the AM screen that is used by default, and the FM screen that is triggered by the 100 lpi condition.
  - In the DTP application set the line screen of an object (e.g. a company logo) – that you wish to be printed with FM screening – to 100 lpi.
- **Traditional/stochastic screening:** specifies whether traditional (AM) or stochastic (FM) screening will be used.
- **AM/FM settings:** the detailed settings for each screening type.
- **Limits:** allows the user to define upper and lower screen limits (e.g. limiting the maximum tint to 90%, common in the gravure industry, or knocking out tints below 2%, common in the flexo industry). See [9.7.3 Limits tab \(page 161\)](#) for details.
- **Density modulation:** a unique feature of StudioRIP, typically used for inkjet, allowing the operator to control the density of the ink depending on the dot percentage (e.g. a 10% tint may use 100% ink density, but a 90% tint just 40% density). See [9.7.4 Density modulation tab \(page 162\)](#).



### 9.7.1 AM settings tab

The AM settings tab defines the parameters of the traditional (AM) screening. The following controls are available:

- **Frequency:** the line screen frequency, in lpi, of the halftone. Specifying *Default* will use the

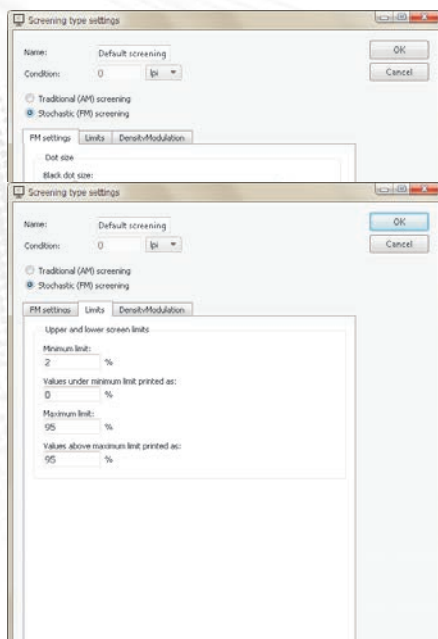
global line screen frequency value (defined in the job style dialog or coming from the PostScript file). It is strongly recommended that this value is kept and used, change it only in special situations, when a second, different line screen is needed than the default one.

- **Frequency tolerance:** unless a very accurate line screen frequency must be achieved for special reasons, leave it on 2%: StudioRIP needs the freedom to choose the best screen set in the proximity of the required one (e.g. in case of  $170 \pm 2\%$ , it will search for the best screen set in the 166.6–173.4 lpi range for the best quality screen set). Limiting this freedom may lead to quality problems (patterning on individual films, inconsistent rosettes), while leaving it on 2% StudioRIP guarantees consistently perfect quality.
- **Dot shape:** the shape of the screen dot. Specifying *Default* will use the global dot shape value (defined in the job style dialog or coming from the PostScript file). It is strongly recommended that this value is kept and used, change it only in special situations, when a second, different dot shape is needed than the default one.
- **Hybrid screening:**
  - *OFF:* traditional AM screening will be used.
  - *Normal (offset):* simple, offset optimized hybrid screening will be used, with stochastic removal of dots above and under the specified limit.
  - *Shifted (flexo):* a flexo optimized hybrid screening will be used that has a transition from pure AM towards pure FM, shifting away dots from their AM grid until the achieved grid has a pure FM look. This is important if the dots in the highlights are big, and therefore a pleasant hybrid pattern is necessary.
  - *Pillar (flexo):* another flexo optimized hybrid screening based on the principle that very small dots can print if they are supported by stochastically distributed bigger dots acting as pillars, protecting the small dots from bending or sinking in the anylox cells.
  - *Shifted + pillar (flexo):* the combination of the two flexo modes, both technologies acting together.
- **Hybrid transition limits (modes without flexo shift):** specify the minimum and maximum allowed size (in percents or microns) of the screen dots. As a result, the halftone will have the following phases:
  - Pure AM (e.g. 3–97%): the dot has a perfect grid structure, and acts like a traditional halftone dot.
  - AM-FM hybrid (e.g. 0–3% and 97–100%): instead of the dots getting any smaller than the specified limit, they are stochastically removed. See more in [9.5.5 Great highlight and shadow detail \(page 155\)](#).
- **Hybrid transition limits (shifted flexo modes):** specify the minimum and maximum allowed size (in percents or microns) of the screen dots, as well as size of the dots at the other end of the AM-FM transition phase. As a result, the halftone will have the following phases:

- Pure AM (e.g. 35–65%): the dot has a perfect grid structure, and acts like a traditional halftone dot.
  - AM-FM transition (e.g. 3–35% and 65–97%): as the dots get smaller (from 35% towards 3% and from 65% towards 97% in our example), they are slowly drifted towards a stochastic structure from the gridpoints, ending up (at 3% and 97% in this example) in a structure that looks almost perfectly stochastic. If the values are closer to the extremes (e.g. 30% instead of 35% or 70% instead of 65%), the structure reached at the end of the phase will be less stochastic. If the values are closer to 50% (e.g. 40% instead of 35% or 60% instead of 65%), the structure reached will be closer to a true stochastic structure. On the other hand, the visual impact of an AM-FM transition phase is worse than that of the pure AM phase, thus the need to keep it as small as possible. The default values are a good compromise between a relatively small transition phase and a relatively pleasant stochastic structure at the ends. See more in [9.5.6 Increased highlight quality for flexo](#) [\(page 155\)](#).
  - Pure FM (e.g. 0–3% and 97–100%): instead of the dots getting any smaller than the specified limit, they are stochastically removed. If the starting point (e.g. 3% and 97%) has a true stochastic structure, this phase will act as a pure FM screen, having a pleasant, pattern-free look. This is why it is preferred by flexo operators: due to the huge dot gain of the flexo in highlights, it is very important for this phase to have the highest possible quality, even at the expense of a lower quality in the FM-AM phase.
- **Hybrid transition limits (pillar modes):** specify the minimum and maximum dot size of the normal (non-pillar) dots. In conjunction with the pillar dot settings, the halftone will have the following phases:
- AM-FM hybrid (e.g. 0–1%): instead of the dots getting any smaller than the specified limit, they are stochastically removed. See more in [9.5.5 Great highlight and shadow detail](#) [\(page 155\)](#). At this phase the dots are so small that normally won't print at all on flexo, but will only act as supporting shoulders for the pillar dots.
  - Pillar building phase (e.g. 1%–1.5%): the specified percent of dots (see *Density of pillar dots*) will be transformed to pillar dots, their sizes being increased to the size specified by the *Size of pillar dots* parameter (in this example the 1.5% being achieved by the blended pillar and normal dots).
  - Pillar-AM transition (e.g. 1.5%–6%): the normal dots will gradually get bigger until they reach the size of the pillar dots.
  - Pure AM mode (e.g. 6%–97%): the screen acts like the traditional offset screen.
  - AM-FM hybrid (e.g. 97–100%): the dots are stochastically removed again.
- **Size of pillar dots:** the size of the big dots, acting as pillars, in percents or microns (see above).



- **Density of pillar dots:** the density, in percents, of the dots that will act as pillar dots (see above).
- **Low-pass (gradient smotherer) filter width:** achieves better color accuracy at the expense of slightly noisier tints, generally improving the look of gradients. See more in [9.5.7 Low-pass filtering of the tonal jumps \(page 156\)](#). If the slight size variation of halftone dots is not desired, it can be turned off (setting it to 0%). It may be further increased for suppressing the banding or patterning of the output device.
- **Dot centered rosette:** controls whether the C, M and K screens will form *dot centered* or *clear centered* rosettes. Small registration errors can cause color changes, these are less noticeable if clear centre rosettes are used. Dot centered rosette appear more pleasing to the eye.
- **Smoothness optimized:** makes halftones smoother by forcing all halftone dots to have the same shape but in the same time distributed perfectly evenly (which normally doesn't happen, see [9.3.4 Patterning of individual colors \(page 150\)](#)). As such halftones cannot have angles like 15 degrees (see [9.3.2 Angle inaccuracy \(page 149\)](#)), they cannot form a traditional rosette. Instead, a different rosette pattern is formed by heavily deviating the angles and frequencies. The rosette pattern achieved this way is less pleasing for the eye and also less tolerant for shifts and rotations, therefore the use of this option is recommended only in justified cases (such as laser printers where very high lpi values are used in conjunction with very low dpi values, e.g. 150 lpi @ 600 dpi).



### 9.7.2 FM settings tab

The FM settings tab defines the parameters of the stochastic (FM) screening. The following controls are available:

- **Black/white dot size:** specifies, in microns, the size of the dot size that will be used in the pure FM phase of the FM screening. The actual pixel structure of the dot is also displayed. Note that the sizes of the black and white dots can be different, see [9.6.6 Different black and white dot size \(page 157\)](#).
- **FM limit:** specifies the end of the pure FM phase. From this limit on, no more dots will be added, but the sizes of the existing dots will be increased instead. The default value is 17%, which empirically seems to produce the most pleasant result.
- **Cell size:** specifies the size, in device pixels, of the supercell. Small supercells may cause a tilting effect, the human eye may recognize the repeating pattern of the stochastic screen. On the other hand, big supercells may cause bad screen generation performance (normally generating the four stochastic screens takes about one minute). The cell size of 500 pixels seems to be a good compromise.

### 9.7.3 Limits tab

Certain print technologies need the minimum or maximum screen percentage to be limited:

- It is common in the gravure industry to limit the maximum tint to 80–90%.
- It is common in the flexo industry to knocking out tints below 2%.

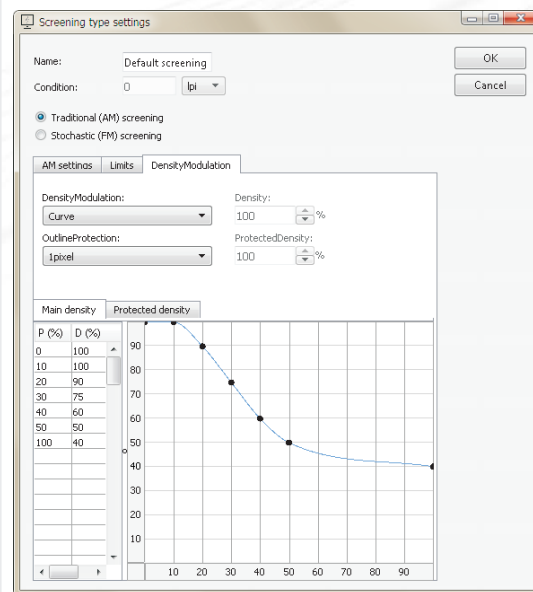
The goal of the screen limitations is to let the operator implement these limitations. The available settings are:

- **Minimum limit:** the minimum screen percentage that prints normally. Tints below the minimum limit will be printed as specified below.
- **Values under minimum limit printed as:** specify the percentage used for printing the tints below the *Minimum limit* value. This is typically either equal to the minimum limit (e.g. under 3% everything is printed as 3%), or equal to zero (e.g. under 3% is everything is printed as 0%).
- **Maximum limit:** the maximum screen percentage that prints normally. Tints above the minimum limit will be printed as specified below.
- **Values above maximum limit printed as:** specify the percentage used for printing the tints above the *Maximum limit* value. This is typically either equal to maximum limit (e.g. above 97% everything is printed as 97%), or equal to 100% (e.g. above 97% is everything is printed as 100%).

#### 9.7.4 Density modulation tab

Density modulation is very powerful feature of StudioRIP, allowing the ink density to change according to the halftone percentage, typically using high density on small dot percentages, and decreasing the ink density to higher halftone percentages. Although this functionality is implemented in the Epson driver as well, the recommended use is through this dialog: the speed and the quality of the density modulation will be significantly worse using the Epson driver due to the technical challenge of recognizing halftone percentages on the 1-bit data (while the screening system has it as precise incoming data). The available controls are:

- **Off:** no density modulation is performed (recommended for most laser machines will; use it for inkjet CTP/CTF or other inkjet repro solutions);
  - **Constant:** no modulation is performed, but instead a constant density value is used;
  - **Curve:** the density is modulated according to the halftone percentage according to the specified curve (see below).
- **Outline protection:** specifies whether the outlines (e.g. the edges of screen dots or vectors) should have different density than the main areas, and if so, an outline of how many pixels to be treated in a different way.
- **Density table:** defines the density curves for the main areas and the outline. Enter the halftone percentage to the left column of the table, and the assigned density to the right column. For example if you want a 10% halftone to have full density, write 10 to the left column, and



100 to the right column. If you want the the 90% halftone to have 40% ink density, write 90 to the left column, and 40 to the right column. We recommend a smoothly decreasing curve to be used, with high density values for low halftone percentages, decreasing towards the optimal ink thickness of the 100% tint. Pay attention to the potential non-linearity caused by the too steep curves (e.g. a 20% halftone with 70% ink density may print lighter than a 15% halftone with 100% ink density). Using this module, the density range goes up to 100% (while the Epson module is able to print 300% by increasing the droplet size).

## 9.8 TEST SCREEN WINDOW

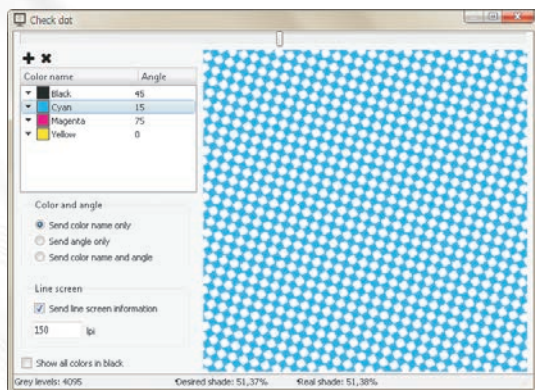
The *Test screen* window provides a visual interface for testing the screen settings of a job style. It can be accessed by pressing the *Test screen* button in the *Job style* dialog, see [6.1.10 Screening task \(page 77\)](#).

The goal is to test the reaction of the screening system as set up in the job style (including the effects of the screen rules, angle tables etc.) for the possible incoming values (whether and how the angle, screen frequency, plate name etc. are declared in the PostScript file). Note that while testing a screen that has not been generated before, it may take seconds or even minutes for the screens to be generated and displayed in the preview area.

By default, the tester is set up to test a typical PDF situation: only the color names and nothing else is declared (so the angles are looked up from the *Angle table*, and the default screen frequency, dot shape etc. will be used). It is possible though to simulate line screen and angle declarations too, as explained below.

The following controls are available:

- **Dot percentage:** will change the simulated percentage of the selected color(s). Each color has its own percentage, but they can also be changed together by selecting multiple colors and then adjusting this control.
- **The list of the tested colors:** by default cyan, magenta, yellow and black.
  - New colors can be added with the *Add color* and *Delete color* buttons.
  - Selecting one or more colors will show the selected color(s) in the preview area (useful for testing rosette or moiré).
  - The color can be changed by clicking on the arrow to the left of the icon, and selecting the desired color from the ink list.
  - The angle can be changed by clicking on it, and typing it into the editor, which should appear in a second.
- **Color and angle:** specifies whether the color name, angle or both will be sent to the screening module.



- **Line screen:** specifies whether and what line screen information will be sent to the screening module. This is the way to test any extra screening types, conditioned by a given lpi value. This control will be automatically set if a screening type is selected in the *Job style* window prior to pressing the *Test screen* button.
- **Show all colors in black:** will modify the display of the preview area, showing all selected colors in black.

# 10 Proofing



StudioRIP has its own built-in proofing system. Acting from the inside of StudioRIP (rather than being an external application) it is able to proof jobs in various stages (processed, printed or archived) and views (composite or imposition) with one click. As the proofer appears in the StudioRIP system as another job style, printing a proof will be as simple as printing any other job in the StudioRIP system, assisted by the same media saving and previewing environment.

StudioRIP has implemented all widely used proofing models: its contone, halftone and raster (dot for dot) proofing modules allow users to choose the right solution for their specific needs.

## 10.1 BASIC CONCEPTS

### 10.1.1 What is digital proofing for?

The goal of proofing is to predict the output of a given printing technology (for example, offset) by printing a proof of it on an inkjet or laser printer. Using the right color management techniques, the printed proof will have exactly the same (or at least similar, in case of content proofing) color as the final print; in case of halftone or raster proofers, even the halftone structure will be similar or exactly the same.

Proofs are used for:

- **Content proofing:** for spelling errors, layout problems etc. — these proofs are printed quickly, without paying too much attention to the image quality and color accuracy;
- **Color proofing:** predict almost perfectly the color of the output too, thus the term *contract proofing*. Printing these proofs may take time, printing an A3-sized high quality contract proof on an average inkjet printer may take 5-10 minutes.

### 10.1.2 Contone proofs

Contone proofers use the original PS/PDF file, process it with their internal PS/PDF interpreter, apply the right color management, and print it on the color printer as a continuous tone image.

Because the job will be interpreted twice, there is a slight chance of content differences (though in StudioRIP they will be interpreted by the same PS engine under the same conditions, so this chance is little more than theoretical).

Advantages:

- **Color accuracy:** the typical color accuracy is about  $\Delta E = 0.7$ .
- **High printing speed:** a typical Epson printer can print an almost perfect quality image on 720×720 dpi, using bidirectional mode, resulting in a printing speed of approx. 1–2 minutes/A3 page.

- **One profile needed:** the profiling work needs to be done just once, and then various ICC files can be simulated by one mouse click.

Disadvantages:

- **Data integrity:** there is a slight theoretical chance for content differences between the proof and the print.
- **Lower speed:** the file needs to be processed twice.
- **Imposition:** only automatic impositions, that can be replicated in the proofing process, can be simulated.

The slightly confusing name of the contone proof leads to the common misconception they don't use screening techniques, but rather print contone images directly. Although the image of contone proofs look smooth and, on the good quality ones, there is no visible screening, under a lens or microscope the presence of the screening becomes obvious. However, the smoothest possible screening algorithms are used, so that on good quality proofs the output looks indeed contone to the naked eye.

When printing contone proofs, StudioRIP uses a different screening technique than normally: using an inkjet printer, it will take advantage of a special, inkjet optimized stochastic screening technique, enhanced by the use of light inks and the variable droplet size technology of many printer models.

#### 10.1.3 Halftone proofs

Halftone proofers are hybrid contone-raster proofers: their working principle is similar to contone proofers, but their result is similar to raster proofs. Halftone proofers use the original PS/PDF file, process it with their internal PS/PDF interpreter, apply the right color management, and print it on the color printer as a halftoned image, using a halftone structure that is as similar as possible to the target (simulated) halftone.

However, as quality halftone proofers simulate the ink colors of the target technology – not just the spot colors, but even the slightly different colors of the process inks (also called ink contamination) –, halftone proofers are more than just profiled halftone printers. Beyond the accurate simulation of halftone inks, StudioRIP's halftone proofing implementation succeeds in maintaining the full gamut of the proofer by controlling the ink contamination and, when needed, progressively removing it.

A major disadvantage of halftone proofing is that, although very similar to the target, its halftone structure may be visibly different: for example, a magenta halftone of a few percents may be added to pure cyan tints (in order to get accurate color on the proofer), while raster proofers (usually at the expense of a worse color accuracy) will keep the original halftone structure dot by dot, the color management taking effect through the ink color modulation.

Advantages:

- **Color accuracy:** the typical color accuracy is about  $\Delta E = 0.8$ .
- **Fairly good halftone simulation:** although not keeping the original dot structure, the halftones are very similar and most differences are invisible to the naked eye.

Disadvantages:

- **Data integrity:** there is a slight theoretical chance for content differences between the proof and the print.
- **Lower speed:** the file needs to be processed twice.
- **Lower printing speed:** to achieve a good quality and moiréless halftone, the 1440×1440 dpi, unidirectional mode is recommended on a typical Epson printer, resulting in a printing speed of up to 4–10 minutes/A3 page.
- **Imposition:** only automatic impositions, that can be replicated in the proofing process, can be simulated.

#### 10.1.4 Raster proofs

Raster proofers take the already processed raster data, as it will be imaged on the imagesetter/CTP, simulating the in-rip imposition, halftone dots etc. on the proof.

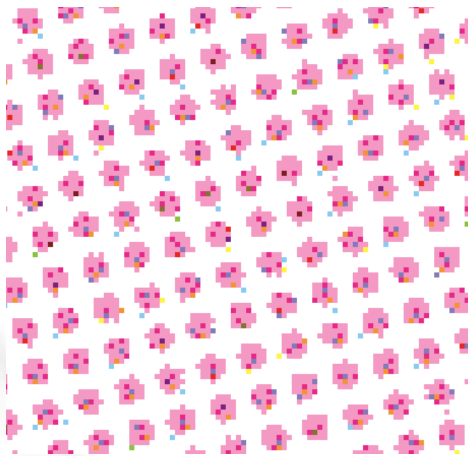
Advantages:

- **Guaranteed data integrity:** content differences between the proof and the print are impossible.
- **Halftone simulation:** the look of the proof will be more authentic; it also might help in detecting moirés.
- **Imposition simulation:** the user has the ability to simulate even manually made impositions.
- **Ease of use:** using the already ripped files, proofs can be created with one mouse-click.
- **Fast:** the job does not have to be processed twice.

Disadvantages:

- **Reduced color accuracy:** the typical color accuracy is about average  $\Delta E = 2.5$  (whereas contone and halftone proofing easily achieves average  $\Delta E < 1$ ),
- **Several profiles needed:** the profiling operation needs to be done for each simulated ICC, as well as for every utilized line screen, calibration curve, etc.

It is a common misconception that the simulated C, M, Y and K halftones are made directly with the C, M, Y and K inks of the inkjet printer. In reality, things are much more complicated. The inkjet inks are usually more saturated (offering wider gamut), and simulating the offset inks will be achieved by blending the inkjet inks (in the case of the primaries, this is also called *ink contamination*).



The picture shows a magenta halftone, simulated on a proofer. The basis of the halftone is the light magenta ink of the proofer, but the normal magenta ink is also used to make it darker (see the darker magenta pixels). Light cyan and yellow contamination pixels are also visible, making it less saturated, and obtaining the right color. The frequency of this screen is 170 lpi, resampled from 2400 dpi to 1440 dpi.

Moreover, using this technique, a raster proofer can simulate any inks used in the printing process, not just cyan, magenta, yellow or black. There is absolutely no difference between simulating an offset magenta or a Pantone 386 C, both offset inks will be a blend of the inkjet inks.

Another common misconception is that only large professional inkjet printers are able to print raster proofs; in reality, driven by StudioRIP, even small A3 desktop printers produce smooth halftones of 150-200 lpi.

Indeed an inkjet printer cannot print with the quality of an imagesetter, and inkjet printers working as imagesetters or platesetters are used only for less demanding applications (screen printing, newspaper industry, etc.), usually on low screen rulings or with stochastic screening. However, it would be the wrong conclusion to think that they are unable to produce prints that are *visually equivalent* to an offset print.

The trick is that while imagesetters must produce compact, sharp halftone dots (otherwise it could not be used by the printing press), the halftone dot on the proofer can be 'crumbled' – the human eye is unable to perceive that on the paper. An inkjet printer with a resolution of at least 1200×1200 dpi, used in conjunction with light inks, is able to produce a perfectly smooth halftone screen of up to 200 lpi, which the human eye can hardly distinguish from offset printing (although this halftone screen cannot be used for further processing, because microscopically the dots are 'crumbled' and have low density).

#### 10.1.5 Comparison of proofing techniques

Below is a table with the advantages and disadvantages of the three proofing techniques:

	Contone	Halftone	raster
<b>Color accuracy</b>	Excellent (average $\Delta E = 0.7$ )	Excellent (average $\Delta E = 0.8$ )	Good (average $\Delta E = 2.5$ )
<b>Halftone simulation</b>	None	Good (fairly similar look)	Excellent (dot for dot)
<b>Data integrity</b>	Theoretical chance for errors	Theoretical chance for errors	Errors are impossible
<b>Flexibility</b>	Profiled once	Profiled once (depends on settings)	Profiled for each target
<b>Imposition simulation</b>	Automatic impositions only	Automatic impositions only	All imposition types
<b>Speed</b>	Job ripped twice, fast inkjet printing	Job ripped twice, slow inkjet printing	Job ripped once, slow inkjet printing

### 10.1.6 Color accuracy, $\Delta E$

The most important quality factor of a proofer is the color accuracy, i.e. how close the colors of the proof are to the colors of the target print. As visual comparison is subjective and not always relevant, there are standardized methods for estimating the accuracy of the proofing systems.

These methods are based on the color difference formula called *delta E*, which defines the difference between two colors measured with a spectrophotometer in the Lab color space. There are different delta E formulas, the one considered best is the CIE 2000 formula (as used by StudioRIP), as it gives the most uniform results (while older formulas sometimes give high values for visually indistinguishable colors). The interpretation of the delta E value is subjective, but a generally accepted interpretation is the following:

- $< 1$ : a perfect match: the color differences are indistinguishable to the human eye.
- 1–3: an excellent match: the color differences are distinguishable only on large patches touching each other (i.e. without a gap). Patches separated by gaps are generally not distinguishable.
- 3–6: a good match: the color differences are clearly distinguishable on large, touching patches, but are generally difficult to distinguish on two different prints (e.g. the difference between the proof and the original print can be hard to spot).
- 6–10: an acceptable match: the color differences are clearly distinguishable even on different prints, but the difference is not disturbing.

When estimating the accuracy of a proofer, the average  $\Delta E$ , maximum  $\Delta E$  and maximum  $\Delta E$  for primaries are taken in account.

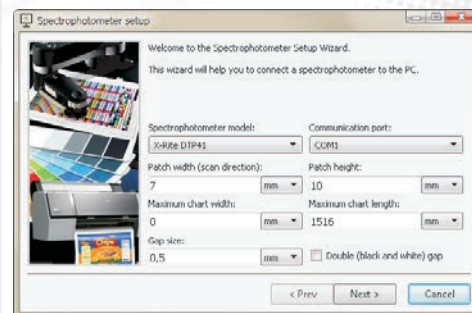
## 10.2 SETTING UP THE PROOFING SYSTEM

### 10.2.1 Spectrophotometer setup

It is impossible to set up the proofer without a spectrophotometer, therefore it is critical to have a spectrophotometer installed in the system. The spectrophotometer has to be connected to a PC that runs the Client application (rather than to the Server PC).

The spectrophotometer can be set up by the *Spectrophotometer setup* item in the *Proof* menu. The following settings are available:

- **Spectrophotometer model:** the current version of StudioRIP supports *X-Rite DTP-41*, *X-Rite i1*, *Xrite IO table* and *Datacolor Spyder 3*.
- **Communication port:** the port that the spectrophotometer is connected to. Grayed out if the connection is managed automatically.
- **Patch width (scan direction):** as the profiling charts will be generated for the chosen spectrophotometer, the width and height of the generated patches are set up here (affecting mea-

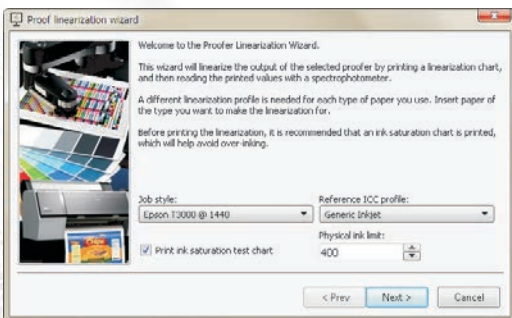




surement accuracy but also speed and print costs). This is the dimension of the patch in the scan direction.

- **Patch height:** the dimension of the patch that is perpendicular to the scan direction.
- **Maximum chart width:** the maximum width of the chart the spectrophotometer is able to deal with (the limitations usually come from the size of the backing table).
- **Maximum chart length:** the maximum height of the chart the spectrophotometer is able to deal with. A value of zero means no limitation.
- **Gap size:** the width of the gaps that separate the patches in scan direction.
- **Double (black and white) gap:** certain spectrophotometers (such as the *X-Rite i1*) give more stable measurements if the special double gaps are used (consecutive black and white gaps of half width).

After setting up the parameters, click *Next*. The wizard will attempt to establish the communication between the StudioRIP and the spectrophotometer, and will report the result.



### 10.2.2 Proofer linearization wizard

The proofer uses a very fine stochastic screening for proofing, used both by the contone and raster modules. To achieve good color accuracy and moiré free output, the proofer must be linearized.

The *Proof linearization wizard* can be launched from the *Proof* menu. The following steps need to be performed:

- Choose the **job style** that needs to be linearized. At this point a native color job style is needed (i.e. not a proof job style, and not a monochrome job style). It is important to choose the profile with the required resolution: for high quality proofs the recommendation is to choose the highest possible resolution (typically 1440 or 1200 dpi). For fast content proofing the recommendation is to choose lower resolution (720 or 600 dpi). After clicking *Next*, a proof chart will be printed. Wait for the printer to finish.
- The **reference ICC profile** should only be modified by experts, in most cases it should be left on *Generic inkjet*. Do not confuse it with the target ICC profile (e.g. *ISO coated*), which is the profile that will be simulated – this profile is used to apply the ink limitation, and it is expected to be as similar as possible to the profile that is about to be created (however, avoid using profiles generated previously by StudioRIP, as they are special proof optimized profiles with poor quality conversion to Lab).
- It is recommended that the **Print ink saturation test chart** option is left checked. This will print a chart to determine the ink absorption properties of the paper on the ink density of the printer. The **Physical ink limit** field controls the maximum amount of ink printed (e.g. 350% means that 100% C + 100% M + 100% Y + 50% K is permitted, but 100% C + 100% M + 100% Y + 51% K is not). On poor quality paper or high ink density it might be necessary to decrease this value to avoid flooding on the paper.

- If the saturation test option was checked, a chart will be printed that almost certainly will have over-inking issues. Find the strip with the highest ink coverage but without wet patches (or slightly wet patches that have a uniform look after drying), then enter the number of the strip into the **Physical ink limit** field.
- The **Light ink limit field** is the maximum amount of light ink used per channel, and it is calculated automatically based on the physical ink limit value. You may change it manually (higher light ink limit gives smoother result, but may produce over-inking).
- In the next step, the calibration chart is printed. Let the print dry (colors will stabilize).
- It is recommended that the **Calculate the limitation values automatically using the reference ICC** option is left checked. This will automatically match each of the CMYK channels to the reference, optimizing the profiling process by having a better prediction of the output, but also eliminating the use of unnecessarily high density. If this option is turned off (this may become necessary if in the unlikely situation of the automatic ink limitation failing to avoid ink flood), the channels can be limited manually (e.g. entering 90% for the cyan channel means that the 90% cyan will be mapped to 100%, becoming the maximum cyan amount that the proofer will use).
- Calibrate the spectrophotometer by clicking the **Spectrophotometer calibration** button.
- If you use fully automatic spectrophotometers (e.g. IO Table), instruct the device to read the entire test chart, otherwise start reading the printed chart row by row (normally using only the buttons on the spectrophotometers, no interaction is needed on the PC). After a successful read, the row index parameter will be incremented; otherwise an error message will appear. In the case of a reading error, a row can be re-read by adjusting the row index before the read.
- After the last row is read, the **Next** button will become active. Click **Next**.
- Check the **Create new job style for this paper type** option if multiple paper types will be used with the proofing system. In this case, one job style will be needed for each paper type. Name the new job style accordingly.
- You may change the **linearization name** for easier identification (especially if it's multiple paper types will be used, in which case it is recommended that the name of the paper type is included in the name).
- Clicking **Finish**, the linearization will be saved, and the new job style will be created (if the option was checked).

### 10.2.3 Contone proof wizard

This wizard will profile the proofer, generating an ICC file that will describe the printer using StudioRIP's contone proofing screening technology, the given paper, resolution, ink and printer settings. The result will be a new job style with the *Proof color management* task checked that will contain the linearization and ICC profiles, and will be ready for printing contone proofs. Running the contone proof wizard first is mandatory for creating halftone proofs.



**It is strongly recommended that the contone proof wizard is run even if only raster proofs will be printed, as it will greatly improve the spot color accuracy.**

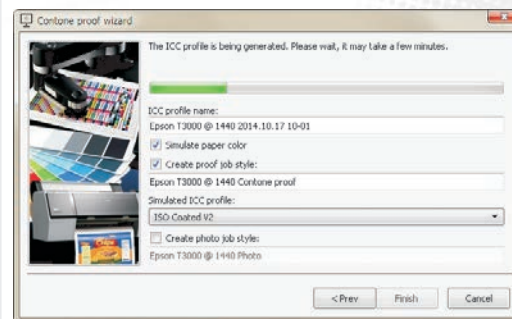
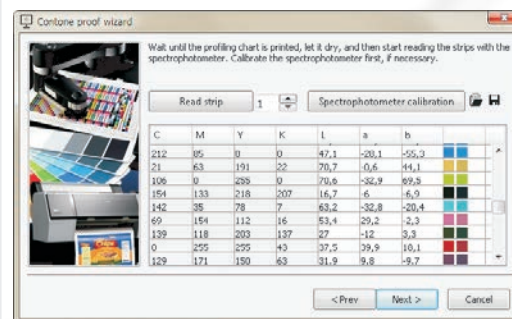
The *Contone proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

- Choose the **job style of the proofing device**: this must be a native color job style (i.e. not a proof job style, and not a monochrome job style), which has been previously linearized (see [10.2.2 Proofer linearization wizard](#), [page 171](#)). If there is no such profile, the wizard will fail.
- Set the **profiling accuracy** parameter, which controls the number of patches printed for the profiling. The default value is 3000 (for high quality profiles), but good quality profiles can be obtained with 2000 or even less patches. The number of patches to print can be controlled directly choosing *custom* profiling accuracy, and changing the **Patches** field.
- For sheet fed printers the number of patches can be also controlled through the **Sheets** field: StudioRIP can calculate automatically the number of patches that will fit on the requested number of sheets.
- The **transverse printing** option, available only for sheet fed printers, allows the profiling chart to be printed 90° rotated on the paper. In case of an A3 printer, for example, it will print the strips on the length of the A3 sheet rather than on the width, resulting in less (but longer) strips. Consider the strip width limitation of the spectrophotometer before choosing this option (e.g. a *DTP-41* will read the length of an A3 sheet, but an *i1* won't).
- The **reference ICC profile** should only be modified by experts, in most cases it should be left on *Generic inkjet*. Do not confuse it with the target ICC profile (e.g. *ISO coated*), which is the profile that will be simulated – this profile is used to build the patch list, and it is expected to be as similar as possible to the profile that is about to be created (however, avoid using profiles generated previously by StudioRIP, as they are special proof optimized profiles with poor quality conversion to Lab).
- The **ink limitation** parameter is normally defaulted to the value calculated by the *Proof linearization wizard* (and stored in the linearized job style), so normally it should not be modified by the user. However, experts may change it. This option controls the maximum quantity of ink that the proofer is allowed to print (e.g. 250% means that, for example, C: 100, M: 100, Y: 50 is allowed, but C: 100, M: 100, Y: 60 is not). Generally 250% is enough to cover the whole gamut, with the right use of the black ink. Higher values may improve the gamut, but may also cause ink flow problems. Lower values may cure ink flow problems, but also limit the gamut.
- Choose the **black generation** value (i.e. the balance of CMY and K inks for printing gray components of colors). This value is automatically chosen based on the available light inks on the printer:

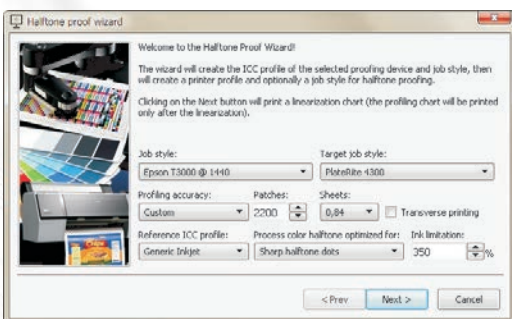
- recommended setting for printers with LK and LLK inks is the highest possible black generation value (*Maximum*), as even the lightest grays are smoothly printed without CMY inks;
- recommended setting for printers with LK ink is *Medium* black generation, as in highlights the use of CMYK will still produce smoother results;
- recommended setting for printers without light black inks is *Minimum* value, as using black ink only will produce grainy tints in highlights and midtones.

If color accuracy is the main consideration, and the graininess of the tints is less important, use maximum black generation even for printers without light black inks: the color stability will be considerably better.

- Click **Next**. The profiling chart (consisting of one or more pages) will be generated and printed.
- Let the print dry (colors will stabilize). Taking into account the accuracy needed at this phase, the recommendation is to wait at least 10 minutes.
- Calibrate the spectrophotometer by clicking the **Spectrophotometer calibration** button.
- If you use fully automatic spectrophotometers (e.g. IO Table), instruct the device to read the entire test chart, otherwise start reading the printed chart row by row (normally using only the buttons on the spectrophotometers, no interaction is needed on the PC). After a successful read, the read patches will appear in the list (the expected and measured colors are also displayed in order to allow a visual check whether the right row has been read), and the row index parameter will be incremented; otherwise an error message will appear. In the case of a reading error or simply a suspicious read, rows can be re-read by decrementing the row index before the read. The wizard performs an automatic comparison between the expected and measured colors, and in case of big differences will warn about a possible reading problem.
- After the last row is read, the **Next** button will become active.
- Click **Next**. The profile will be generated (typically taking about 10 seconds, usually not more than 1 minute). The progress bar will indicate the ICC generation progress. After the profile is generated, the **Next** button will become active.
- You may change the **ICC profile name**, as it will appear in the *Color profiles* list.
- Choose the **Contone proof job style name**, as it will appear in the *Job styles* list.
- The **Simulate paper color** option specifies whether the proof should simulate the color of the target paper (typically printing a yellowish tint on the bright white proofing paper in order to match the color of the offset paper). Unchecking this option is, strictly speaking, incorrect, as the proof will still remain absolute (possibly resulting in visible white spots in light areas – the paper color simulation will work for the nearly white colors, but will suddenly stop for the perfect white), but many users prefer not to simulate the paper color.







- Choose the **simulated ICC profile** of the proofs printed with this job style — that is, the target (e.g. offset) ICC profile.
- The **Create photo job style** option creates a job style that can be used for photo printing (or generally speaking not for proofing). This means that instead of simulating a given target ICC, StudioRIP will print the incoming RGB colors accurately, on the widest possible gamut. Note that the safe path is to work with RGB colors only, and let the RIP deal with color separation. Doing color separation on any level before that will be accurate only if the ICC profile created by this wizard is properly set up in the DTP application. See [10.3.5 Photo printing \(page 183\)](#) for further information.
- Clicking the *Finish* button, the proof job style(s) will be created, ready to print contone proofs.

#### 10.2.4 Halftone proof wizard

This wizard will profile the proofer in halftone mode for a given target job style, generating an ICC file that will describe the printer using the screening technology of the target job style on the given paper, resolution, ink and printer settings. The result will be a new proof job style (a job style with the *Proof color management* task checked) that will contain the linearization, the contone and halftone ICC profiles and the target job style, and will be ready for printing halftone proofs.

Halftone proof job styles are less flexible than contone proof job styles (as they can be used only for the job styles they have been profiled for), but more flexible than raster proof job styles (as the calibration of the target job style will not affect color accuracy).

**A different halftone proof job style is necessary for each simulated job style. For each new job style, or if any of the settings of a profiled job style is changed (ICC or screen settings), a new profiling procedure is necessary, otherwise color accuracy isn't guaranteed.**

The *Halftone proof wizard* can be launched from the *Proof* menu. Note that the Halftone proof wizard will run only for profiles that were previously profiled with the Contone proof wizard.

The following steps have to be performed:

- Choose the **job style of the proofing device**: this must be a native color job style (i.e. not a proof job style, and not a monochrome job style), which has been previously linearized (see [10.2.2 Proofer linearization wizard \(page 171\)](#)) and contone profiled (see [10.2.3 Contone proof wizard \(page 172\)](#)). If there is no such profile, the wizard will fail.
- Select the **target job style**: this will specify the simulated ICC profile and the screening parameters that the halftone proof will simulate (e.g. ISO Fogra 27, 150 lpi, Euclidean, etc.).
- Set the **profiling accuracy** parameter, which controls the number of patches printed for the profiling. The default value is 3000 (for high quality profiles), but good quality profiles can



be obtained with 2000 or even less patches. The number of patches to print can be controlled directly choosing *custom* profiling accuracy, and changing the **Patches** field.

- For sheet fed printers the number of patches can be also controlled through the **Sheets** field: StudioRIP can calculate automatically the number of patches that will fit on the requested number of sheets.
- The **transverse printing** option, available only for sheet fed printers, allows the profiling chart to be printed 90° rotated on the paper. In case of an A3 printer, for example, it will print the strips on the length of the A3 sheet rather than on the width, resulting in less (but longer) strips. Consider the strip width limitation of the spectrophotometer before choosing this option (e.g. a DTP-41 will read the length of an A3 sheet, but an i1 won't).
- The **reference ICC profile** should only be modified by experts, in most cases it should be left on *Generic inkjet*. Do not confuse it with the target ICC profile (e.g. *ISO coated*), which is the profile that will be simulated – this profile is used to build the patch list, and it is expected to be as similar as possible the profile that is about to be created (however, avoid using profiles generated previously by StudioRIP, as they are special proof optimized profiles with poor quality conversion to Lab).
- The **ink limitation** parameter is normally defaulted to the value calculated by the *Proof linearization wizard* (and stored in the linearized job style), so normally it should not be modified by the user. However, experts may change it. This option controls the maximum quantity of ink that the proofer is allowed to print (e.g. 250% means that, for example, C: 100, M: 100, Y: 50 is allowed, but C: 100, M: 100, Y: 60 is not). Generally 250% is enough to cover the whole gamut, with the right use of the black ink. Higher values may improve the gamut, but may also cause ink flow problems. Lower values may cure ink flow problems, but also limit the gamut.
- Set the **Process color halftone optimized for** parameter: as StudioRIP simulates all inks of the target (e.g. offset) technology – not just the spot colors, but also the cyan, magenta, yellow and black inks –, the simulated process color inks are blended from the proofer inks (e.g. a typical offset cyan is blended from 85% proofer cyan + 15% proofer magenta + 5% proofer yellow), which may result in somewhat blurry halftones. This setting lets the operator turn off or limit the ink blending for process colors (e.g. the cyan halftone being printed with 100% proofer cyan ink), resulting in sharper halftones. Although the color accuracy of the proof is not affected by this setting (the ICC profile will be generated accordingly), there are pros and cons to using sharp dots:
  - **Advantages:** sharper, more realistic halftones and rosettes; independence from the target ICC profile (changing the target ICC profile will not imply re-profiling);
  - **Disadvantages:** the halftone structure may be visibly different on certain colors (e.g. pure cyan tints will have magenta halftones); the different color of the ink may become visible on low line screens.

- Click *Next*. A halftone linearization chart will be printed, measure it in the same way as in the proofer linearization wizard. You may change the **linearization name**.
- Click *Next*. The profiling chart (consisting of one or more pages) will be printed.
- Let the print dry (colors will stabilize). Taking into account the accuracy needed at this phase, the recommendation is to wait at least 10 minutes.
- Calibrate the spectrophotometer by clicking the **Spectrophotometer calibration** button.
- If you use fully automatic spectrophotometers (e.g. IO Table), instruct the device to read the entire test chart, otherwise start reading the printed chart row by row (normally using only the buttons on the spectrophotometers, no interaction is needed on the PC). After a successful read, the read patches will appear in the list (a visual comparison between the expected and measured colors is also possible to check whether the right row has been read), and the row index parameter will be incremented; otherwise an error message will appear. In the case of a reading error, a row can be re-read by decrementing the row index before the read. The wizard performs an automatic comparison between the expected and measured colors, and in case of big differences will warn about a possible reading problem.
- After the last row is read, the *Next* button will become active.
- Click *Next*. The profile will be generated (typically taking about 10 seconds, usually not more than 1 minute). The progress bar will indicate the ICC generation progress. After the profile is generated, the *Next* button will become active.
- You may change the **ICC profile name**, as it will appear in the *Color profiles* list.
- Choose the **Halftone proof job style name**, as it will appear in the *Job styles* list.
- The **Simulate paper color** option specifies whether the proof should simulate the color of the target paper (typically printing a yellowish tint on the bright white proofing paper in order to match the color of the offset paper). Unchecking this option is, strictly speaking, incorrect, as the proof will still remain absolute (possibly resulting in visible white spots in light areas – the paper color simulation will work for the nearly white colors, but will suddenly stop for the perfect white), but many users prefer not to simulate the paper color.
- Choose the **simulated ICC profile** of the proofs printed with this job style – that is, the target (e.g. offset) ICC profile.
- Clicking the *Finish* button, the proof job style will be created, ready to print contone proofs.

#### 10.2.5 Raster proof wizard

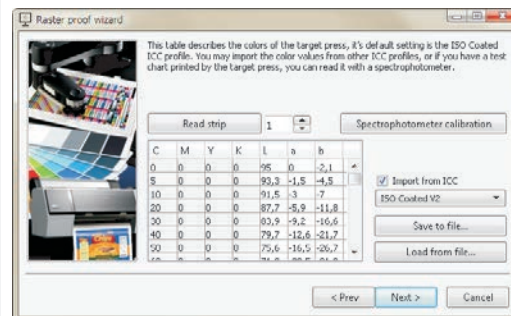
This wizard will create a raster proof job style that will simulate the results of the selected job style. Unlike the contone proof wizard, which profiles the proofer itself, without taking into account the target ICC (or, generally, the simulated printing conditions) during the profiling process, the raster proof wizard will be done only for the given printing conditions, as they are specified in the selected job style.

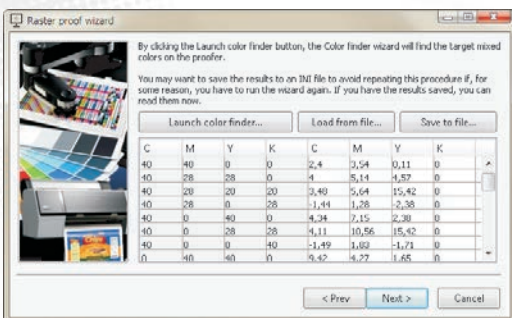
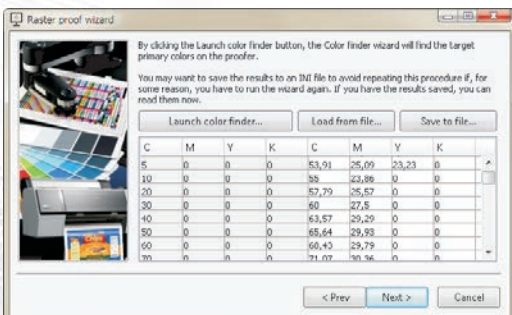
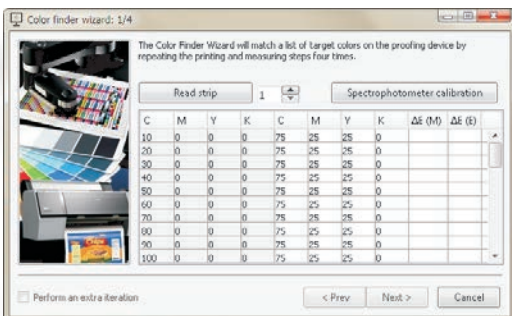
A different raster proof job style is necessary for each simulated job style. For each new job style, or if any of the settings of a profiled job style is changed (ICC, screen or calibration settings), a new profiling procedure is necessary, otherwise color accuracy isn't guaranteed.

Although creating a raster proof job style is possible without the contone profiling being done (i.e. an ICC profile being done for the given job style), for better spot color accuracy it is strongly recommended that a contone profiling (see [10.2.3 Contone proof wizard \(page 172\)](#)) is done before running the *Raster proof wizard*.

The *Raster proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

- A table containing the measurements of 78 patches printed with the target printing conditions must be filled. There are two choices:
  - Choose the ICC profile to simulate, selecting the **Import from ICC** box and choosing an ICC profile from the list. This is recommended if there is an ICC profile for the given printing technology (typically offset).
  - Measure a previously printed target chart which can be found in the *Proof charts* folder of the installation CD. This is recommended if no ICC profile can be found for the given technology (e.g. silk printing). Example: to profile a silk screen printing technology line, print the target chart suitable for the installed spectrophotometer (to save costs, together with a real job, as it's a small, 34×2 cm strip), by silk screen printing, then uncheck the **Import from ICC** box, and read the printed strip with the spectrophotometer. The results can be saved with the **Save to file** button, and can be read back with the **Load from file** button.
- Click **Next**, and choose the **target (simulated) job style**. This is the job style that will process jobs to be output on the target technology (e.g. silk printing, as in the example above). The screen settings, calibration files etc. used during the profiling process will be extracted from the specified job style. Double check that no further changes will be made to the job style, as any change (e.g. changing the calibration curves) will result in color inaccuracy.
- Choose the **job style of the proof device**. This must be a native color job style (i.e. not a proof job style, and not a monochrome job style), which has been previously linearized (see [10.2.2 Proofer linearization wizard \(page 171\)](#)), and preferably also contone profiled (see [10.2.3 Contone proof wizard \(page 172\)](#)). If there is no such profile, the wizard will fail.
- Click **Next**, and choose whether the spot colors will be calibrated (i.e. a contone ICC profile will be used for their accurate reproduction):
  - Selecting the **Calibrated spot colors** option an ICC profile can be specified in the ICC





**profile for calibrated spot colors** drop-down list. This must be the result of a previously performed contone profile wizard. If the chosen job style has already been contone profiled, this option will be automatically selected (the ICC profile will be automatically chosen too), otherwise the contone profiling can be done at this phase by clicking the **Launch profiler wizard** button.

- Selecting the **Uncalibrated spot colors** option is recommended only if spot color accuracy is not critical, as a less accurate approximation algorithm will be used.
- The **Simulate paper color** option will specify whether the paper white of the target technology will be simulated (typically printing a yellowish tint on the bright white proofing paper). Paper color simulation is only possible if the proofer is contone profiled.
- Click **Next**. A table will appear which will contain the amount of proofer inks for achieving various percentages of the primary colors (i.e. cyan, magenta, yellow and black) of the target device. Normally this will be done by the **Launch color finder** button, but the results of previously performed color finder wizards can be loaded by the **Load from file** button.
- The **Color finder wizard** will find the best approximations of the requested colors by printing and measuring charts consecutively (by default 4 print and measure cycles), the latitude for error of each color being incrementally reduced by the consecutive prints. Perform the following steps:
  - At the first step, calibrate the spectrophotometer clicking on the **Calibrate spectrophotometer** button;
  - Wait for the chart to be printed, and let it dry;
  - Measure the chart with the spectrophotometer;
  - The last two columns will show the best measured  $\Delta E$  results (M), as well as the best expected  $\Delta E$  results (E) for the next cycle;
  - Click **Next**, and do the next cycle;
  - After the first 4 obligatory cycles, further cycles can be made by checking the **Perform an extra iteration** box. It is worth performing further iterations if there are colors with high measured  $\Delta E$  values (it is desirable to have  $\Delta E < 1$  for most values, and no values with  $\Delta E > 3$ ), and at the same time the expected values for the next cycle are considerably smaller (otherwise it is perhaps a gamut limitation).
- Clicking **Finish**, the **Color finder wizard** will return and the table will be filled with the primary color values found. It is strongly recommended that these values are saved with the **Save to file** button, so that these partial results can be re-used later.
- Click **Next**. A table will appear which will contain the amount of proofer inks for achieving various mixed colors of the target device. The procedure is exactly the same as for the primary colors: the **Color finder wizard** has to be started (printing and measuring another 4 charts), so in total 8 charts will have to be printed and measured in the raster profiling process. Again, it is recommended that the partial results are saved.



- Having both the primary and mixed colors found, the profiling is done. Click *Next*, and fill the **color correction profile name** (as it will appear in the *Color correction profile* setting of the job styles), and the **raster proof job style name** (as it will appear in the *Job styles* list).
- Clicking *Finish* the raster job style will be created, ready for printing raster proofs.

### 10.2.6 Test proof wizard

It is strongly recommended that the test proof wizard is run after either proof wizards (contone, halftone or raster). This will test the proof in normal working conditions (i.e. printing the proof as a regular PDF job rather than an internal test), so having good results in this wizard will guarantee that the proofer is accurate.

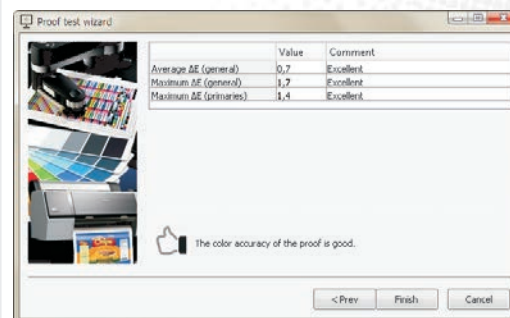
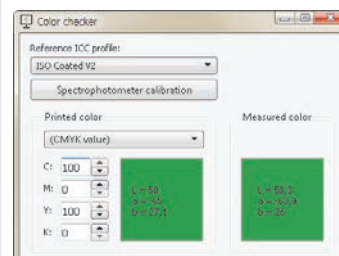
**The test proof wizard works only for ICC based proof job styles, so raster proofs based on measuring the *Target chart* cannot be tested.**

The working principle of the wizard is that it prints a chart containing CMYK patches, and compares the printed and measured patches with the values specified by the ICC profile (i.e. whether the measured Lab value of a given CMYK patch matches the Lab value provided by the ICC profile).

The *Test proof wizard* can be launched from the *Proof* menu. The following steps have to be performed:

- Check the **Print test page with job style** box if you want a print a test page with the proofer now. Note that the wizard can be used to measure any standard Fogra test charts (e.g. the accuracy of the press can be checked with this wizard as well), in which case it may not be necessary to print the chart. Check the **Send the page immediately for output** box if the proofed job does not need confirmation (e.g. for checking the positioning on the media).
- Click *Next*. If the **Print test page with job style** box was checked, the test chart will be printed now. Wait for the printer to finish, and let the print dry.
- If a job style was used, the **Target ICC profile** box will be automatically set to the ICC profile used by the job style. Otherwise, the target ICC profile should be manually selected.
- Calibrate the spectrophotometer by clicking on the **Calibrate spectrophotometer** function.
- Read the test chart. The measured  $\Delta E$  values will be displayed for each patch, as well as a visual comparison of the expected and measured colors.
- Click *Next*. The evaluation of the test will be displayed, as follows:

- *Average  $\Delta E$  (general)*: the average of all  $\Delta E$  values;
- *Maximum  $\Delta E$  (general)*: the maximum  $\Delta E$  value;
- *Maximum  $\Delta E$  (primaries)*: the maximum  $\Delta E$  value of the primary colors (i.e. all tints of C, M, Y and K);





- The results of the evaluation will also be displayed in common terms (*excellent*, *good*, *acceptable* or *out of tolerance*).
- The worst of the three results will be displayed as the general result of the test.

Using a decent quality printer and paper (with no gamut problems) StudioRIP proof test results should be at least *good*, but usually *excellent* (especially for contone proofs, which are more accurate). In cases of worse results the possible problems need to be investigated.

#### 10.2.7 Color checker

While the Test proof wizard offers a generic evaluation of the proof accuracy, the color checker wizard can evaluate the accuracy of a given color, either on the proof or on the target print (e.g. offset) against an ICC profile.

This tool is especially useful in cases of color differences between the proof and the target print (e.g. a blue background is greenish on the proof and reddish on the target print), as the operator can check both colors against the reference ICC profile, finding out which of the colors was closer to the reference. To use the color checker, follow the steps below:

- Open the color checker from the Proof menu.
- Set up the Reference ICC profile (e.g. ISO Coated for offset).
- Set up the reference color:
  - for spot colors, choose them from the list (if not listed, define them in the Ink manager, see [6.5 Ink manager \(page 103\)](#));
  - for process colors, specify the CMYK values.
- Calibrate the spectrophotometer, if necessary.
- Point the spectrophotometer at the target print or proof over a compact area of the given color, large enough for a measurement (on a DTP-41 a larger area may be needed because it's difficult to align a given area under the sensor), and measure it.
- The difference between the reference and the measured color will be displayed in terms of  $\Delta E$  (see [10.1.6 Color accuracy,  \$\Delta E\$  \(page 170\)](#)).

### 10.3 PRINTING PROOFS

There are three ways to print a proof in StudioRIP:

- Using the *Proofing* task of a job style;
- Opening a job with a proof job style;
- Using the *Print proof* command of the *Proof* menu (for raster proofs only).

### 10.3.1 The proofing task

The easiest way to proof a job is to check the *Proof* task, and set up the proofing parameters (see more in [6.1.13. Proof color management task <page 82>](#)). This method can be used if the proof is printed *together* with the original job (e.g. the offset plates and the proofs are printed together).

**This method isn't suitable for printing a proof only, without the original job.**

This method will act in slightly different ways for contone/halftone and raster proofs:

- **Contone/halftone proofs:** a second job, with the same parameters as the original one (including imposition), will be opened in the specified contone/halftone proof job style. The proof job will start to process after the original one is finished.
- **Raster proofs:** a second job will be created in the specified raster proof job style as soon as the job is checked (i.e. sent to the *Print manager* or the TIFF catcher). If you change your mind, and don't need the proof, open the *Job information* of the job, and in the *Workflow* task uncheck the *Print raster proof* option.

### 10.3.2 Proof job styles

All proof wizards create job styles prepared to print proofs. These job styles can be used to print proofs directly, without printing to the target device (platesetter, imagesetter etc.).

To print a proof of a PS/PDF job, just open the file, and choose the right job style.

### 10.3.3 Print proof command

The *Print proof* command works only for raster proofing, and only if a processed job is selected (otherwise the menu item will be grayed out). Its functionality is described in [5.4.3. Proofing <page 57>](#).

### 10.3.4 Target ICC for contone

Contone proof job styles (as well as halftone profiles optimized for dot sharpness) have information only about the proofer itself, but not about the simulated printing technology. The target ICC profile of the contone proofing must be specified separately, independently from the profiling process, by selecting the target ICC profile in the job style after the Contone proofing wizard is completed. Also, new job styles can be created for new ICC targets by a few clicks (e.g. if you want to simulate the uncoated ICC target too, create a new job style, and specify the uncoated ICC profile).

As logically the separation profile (used for converting the RGB colors into CMYK) is the same as the target profile (i.e. if the *ISO Coated* profile is used to convert RGB to CMYK, then obviously the same *ISO Coated* will determine how the CMYK colors in the job have to be interpreted), StudioRIP uses the *Separation profile* field of the job style as target ICC (see [6.1.7. Separations task <page 71>](#)).

It is critical to set up the *Separation profile* of the job style properly, if contone or halftone proofs will be printed with it.

#### 10.3.5 Photo printing

A special case of contone proofing is to use it without color management: instead of simulating a target ICC, the incoming CMYK values will be passed directly to the printer driver, and the incoming RGB values will be converted directly to the CMYK color space of the printer.

Photo printing job styles are automatically created by the contone proof wizard, but can also be easily created from contone proof job styles by creating a copy of them, and then changing the separations/target color space to the ICC profile of the printer (see [6.1.7 Separations task](#) *(page 71)*).

If you also set up this ICC profile in the DTP application, then even CMYK objects will be printed accurately.

**Note that colors defined as CMYK might be very different from the generic offset CMYK colors.**

### 10.4 ADJUSTING THE SPEED AND QUALITY

With very few exceptions, modern inkjet printers, that are A3 or wider, are able to print good quality contone, halftone and raster proofs. The major quality issues are:

- **Speed:** printing an A3 proof might take between 1 and 30 minutes; the printing speed is often adjustable at the expense of the quality.
- **Halftone quality:** mechanical inaccuracies often cause grainy halftones or moiré. The accuracy of the head and paper movement has therefore a huge impact on the halftone quality.
- **Color gamut:** the colors of the printer inks heavily influence the color accuracy of the output. Certain printers are unable to reproduce the offset inks accurately, and therefore the proofs will have bad color accuracy.
- **Light inks:** the light versions of the CMYK inks (typically cyan and magenta, but ideally black too) always improve the quality, producing smoother halftones and compact halftone dots. Printers designed for printing large drawings quickly (e.g. architecture), without light inks, might be unable to print smooth halftones.
- **Ink consumption:** certain printers are able to print smooth halftones without using light inks. On these printers, disabling or limiting the use of light inks will cause much smaller ink consumption, at the expense of a minor quality loss.

On certain printers (such as the Epson inkjets) many of the above parameters are adjustable, affecting the quality, speed and ink consumption of the prints. The following chapters will explain the technical problems and the StudioRIP solutions for them.

#### 10.4.1 Light inks

Most inkjet printers used for proofing have light inks (at least light cyan and light magenta, but usually also light black) for a smoother output. As light shades can also be simulated using only the dark inks, the RIP has the freedom to choose the amount of the light inks used. Using more light inks will usually improve the smoothness of the output (using dark inks only will be grainy), but will increase the costs of the print (as about 3 times more light ink is needed to print the same shade as with a dark ink).

The light ink usage can be controlled in the *Proof color management* tab (see [6.1.13 Proof color management task \(page 82\)](#)) using the **Maximum light ink coverage** control, which specifies the maximum permitted coverage (density) of the light inks. Increasing this value to 100% will improve quality, but may cause over-inking problems (as the paper may not support too much ink). The default value of 70% will, on most inkjet printers, avoid ink flow problems.

Light inks are useful not just for avoiding visible droplets in highlights, but also have an important role in suppressing the mechanical inaccuracies of the printer. Banding, grainy tints or moiré can be partially or completely removed by the use of light inks. On most printer models high speed modes produce good quality only with extensive use of light inks.

Using light inks, the StudioRIP proofing module will also produce more compact halftone dots (less 'crumbled' than the ones made purely from dark inks).

Therefore using the default levels of StudioRIP is recommended. However, on low line screen rulings, or in less demanding conditions, using less light inks might produce the required result with much lower printing costs. Also, ink flow problems can be avoided by decreasing these values.

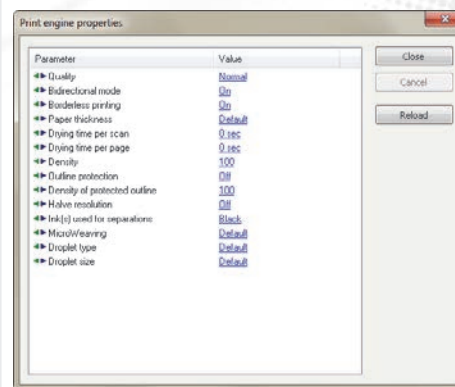
#### 10.4.2 Banding

Certain printer models (such as Epson) allow StudioRIP to adjust the quality of the interlacing at the expense of the printing speed.

The interlacing setting can be accessed only on Epson printers, and only if RIP-based microweaving is selected, in the *Print engine properties* window: in the *Print manager* docker, select the proofer device, then click the *Print engine properties* button (enabled only if the printer is in *Ready* state). Then adjust the *Quality* parameter in the *Interlacing* tab.

By choosing a higher interlacing quality setting it is likely that the banding will disappear, but the printing speed will decrease. Choosing a lower interlacing quality setting the banding might appear, but the printing speed will increase as well.

It is recommended that the fastest possible interlacing quality setting is chosen that produces banding free output. (Note that the light ink settings also affect the banding, see [10.4.1 Light inks \(page 184\)](#).)



To understand the banding phenomenon, the two major technical problems behind must be identified:

- **nozzle inaccuracy:** each nozzle places the droplet consistently with approximately the same error (i.e. the same distance in the same direction from the required position of the droplet).
- **feed inaccuracy:** the paper isn't fed by exactly the required amount.

The banding is caused by the fact that compact bands on the paper (typically one or more neighboring rows of pixels) contain pixels with the same placement error (e.g. 5 microns above their required position), and beside it is another narrow band of pixels containing pixels with another placement error (e.g. 3 microns under their required position). The human eye will perceive this as offensive banding. To suppress this banding, a special interlacing technique is used, based on two ideas:

- **Uniform feed:** the most straightforward idea to build the desired resolution (e.g.  $1440 \times 1440$  dpi) with the native head resolution (e.g.  $720 \times 180$  dpi) is to perform several head passes (16 passes in this example). Before each head pass, the paper is fed and the start position of the head is adjusted by  $1/1440$  inches. After the 16 passes are done, and a 1 inch wide  $1440 \times 1440$  dpi image is built, the paper is fed by one inch. However, feeding the paper uniformly by the same amount (typically about 1-5 millimeters) will greatly improve the result.
- **One scanline printed by more nozzles:** given the uniform feed technique, each scanline on the paper will have several nozzles aligned during the printing process. Distributing stochastically the pixels of the scanline between the available nozzles will also greatly improve the results.



The explanation of the improved results is that the droplets won't form compactly misaligned groups anymore, but rather will have their own, almost random, misalignment. The result is a uniform visual noise rather than banding, with a dramatically reduced visual impact.

Printing the same pixel row with more than one nozzle is particularly interesting, because it can improve the quality at the expense of the printing speed: the more nozzles per scanline, the better the result is (usually printing at about half of the maximum possible speed but giving dramatically improved results).

As some proofers use their own algorithms for selecting the different nozzles for the same row, there are quality differences between different proofers with respect to banding. StudioRIP claims better results than most other proofers when using Epson printers with RIP-based micro-weaving, especially taking into account the availability of the *Quality* setting that can control the number of nozzles per scanline, achieving the best possible result at the expense of slower printing.

#### 10.4.3 Bidirectional mode

Another source of banding and moiré is the bidirectional printing mode (when the head prints



in both directions, introducing another source of inaccuracy). Usually printing in bidirectional mode will cause banding or moiré on halftones, so turning it off (if the option is available) might improve the quality.

Certain inkjet printers allow StudioRIP to control whether the head prints in both directions. Bidirectional printing is almost twice as fast as unidirectional, but introduces another source of inaccuracy in droplet placement, which may cause grainy tints or false moiré on halftones.

The bidirectional mode setting can be accessed (only on certain printer models) in the *Print engine properties* window: in the *Print manager* docker, select the proofer device, and then click the *Print engine properties* button (enabled only if the printer is in *Ready* state). Then adjust the *Bidirectional mode* parameter.

Before turning the bidirectional mode on, a print head alignment procedure is recommended, if available for the printer model. This will minimize the head inaccuracies, calibrating the head placement accuracy.

Most inkjet printers have considerably worse droplet placement accuracy in bidirectional mode. Using bidirectional mode, halftone dots of 150-200 lpi line screens are less sharp (visible especially under a magnifier), and without liberal use of light inks, grainy tints or even moiré will almost certainly appear.

Therefore, for the best quality, bidirectional mode is not recommended. However, the speed doubling offered by the bidirectional mode may be attractive, particularly when, with a liberal use of light inks, the quality loss could be almost imperceptible.

#### 10.4.4 Comparison table of settings

Below is a table with the possible quality settings and their effects:

	More light inks	Finer interlacing	Bidirectional mode
Speed problems	.	↑	↓
Horizontal banding	↓	↓	.
Grainy tints	↓	.	↑
False moiré	↓	↓	↑
Greater costs	↑	.	.

Adjusting these values might have serious effects on the printing speed and quality. For example, printing an A3+ proof on an Epson Stylus Pro 3880, using the 1440 × 1440 dpi mode, takes about 6 minutes (in bidirectional mode and with the *Good speed* value in the interlacing setting), but it will take more than 15 minutes in unidirectional mode and the *Normal* value of the interlacing setting (note that the new Stylus Pro 4900/7900/9900 and their variants are twice as fast, while the SureColor T series are 4 times faster).

Similarly, printing without light inks, with the *Highest speed* interlacing quality setting and in bidirectional mode will produce a grainy output with horizontal banding and false moiré. While using abundant light inks, unidirectional mode and the *Normal* interlacing quality setting will produce a perfectly smooth output and visible rosettes.

# 11 Glossary

- **AM (Amplitude Modulated) screening:** a screening technology which uses dots on fixed positions (a grid), varying their sizes to achieve the desired shades. See [9.3 Understanding digital halftones <page 148>](#).
- **Bleed:** an extra area of a few millimeters around the page (an extension of the intended design), offering tolerance with the cutting precision, for avoiding a white border at the edge of the page. See [8.6.1 Understanding bleed <page 137>](#).
- **Calibration:** a procedure which corrects the dot gain or other color distortion of the print engine or the printing process by pre-distorting the printed jobs. The procedure is based on the calibration curve, which describes the transfer curve of the distortion to correct. See [6.3.1 Understanding calibration <page 94>](#).
- **Capstan:** a simple and cheap technology used by platesetters and imagesetters. Capstan based machines have a fixed laser unit, and the media is slowly moved by the capstan roller during the imaging. The technology has registration and focus problems.
- **CIP 3, CIP 4:** press management systems used to carry in a file information about the job through the entire workflow (pre-press, press, post-press). StudioRIP 3 uses it to pass ink duct control information to the printing press.
- **Client:** StudioRIP Client is one of the three executables of the StudioRIP package. This is the visual interface of the whole system, and can be installed on any workstation in the network. See [2.1 Basic concepts <page 18>](#).
- **CMYK:** stands for Cyan, Magenta, Yellow and Black – the color space of most printing technologies. The colors are achieved on paper or other media by the subtractive combination of these colors (i.e. the inks filter the light which passes through).
- **Color profiles:** see *ICC/ICM*.
- **Composite:** in pre-press, composite generally means *color*. A composite printer prints color image (unlike to a platesetter which prints monochrome images, one color at a time). A composite PS/PDF file is un-separated (unlike the separated PS/PDF file which contains separate pages for each separated plate).
- **Contone** (continuous tone): a contone image data describes the image as a continuous variation of the color, as opposed to halftoned data which works with a limited number of colors (usually the pure colors of the colorants), simulating a contone output by halftoning techniques.
- **Contone proof:** a proof that doesn't simulate the halftone structure of the job, but offers the highest possible color accuracy, as well as the highest printing speed. See [10.2.3 Contone proof wizard <page 172>](#).
- **CTP (Computer to Plate):** a high quality laser printer, printing directly to offset plates, used in the offset industry.
- **Delta E ( $\Delta E$ ):** a formula that defines the difference between two colors, measured in the Lab color space. See [10.1.6 Color accuracy,  \$\Delta E\$  <page 170>](#).
- **Densitometer:** an electronic instrument that is able to measure dot percentages and densities on various media (film, paper or plate). It is used to build the calibration curve and verify accuracy of output.

- **Docker:** a floating child window, which can be docked to a holder. Can be used in either state. Most of StudioRIP's windows are dockers.
- **Dongle:** see *Hard key*.
- **Dot:** halftone dots or stochastic dots are used by the screening technologies to simulate shades. They are small, solid areas of colorants (ink, toner, emulsion) on the media (typically between 20 microns and tenths of millimeters). Arranged in halftone or stochastic screens, from the right distance are perceived by the human eye as shades of the colorant.
- **Dot for dot (raster) proofing:** a proofing technique that simulates the output based on the ripped (halftoned 1-bit) data, keeping the original halftone dot structure.
- **Dotmeter:** a device that measures the dot percentage on the paper or offset plate, generally based internally on a microscope camera.
- **Drum:** relatively complicated and expensive technology used by platesetters and imagesetters. Drum machines have the laser unit slowly moving on a carriage during the imaging, while the media stays tightened on the drum. The technology offers excellent focus and registration.
- **Fast scan direction:** the direction the laser is sweeping the media, perpendicular to the *Slow scan direction*.
- **Flexography:** a printing technology, typically used in the packaging industry (e.g. plastic bags). Needs a specialized screening due to its special technological requirements.
- **FM (Frequency Modulated) screening:** a screening technology which uses a fixed dot size, varying the density of the dot pattern to achieve the desired shades. See [9.4 Understanding stochastic screening \(page 152\)](#).
- **Ghostscript:** a PostScript and PDF interpreter, distributed under GPL (GNU) licensing conditions, available also for commercial redistribution from Artifex Software Inc.
- **Gradient:** a continuous change from a color to another. Offering a smooth gradient from black to white is an important technological goal of printing technologies.
- **Gutter:** space between rows or columns of pages in an imposition.
- **Halftone proof:** a proof that simulates the halftone structure of the job by approximating it (rather than producing a dot-for-dot result, as the *raster proof* does), but offers a significantly higher color accuracy than a raster proof. See [10.2.4 Halftone proof wizard \(page 175\)](#).
- **Hard key:** a small device attached to the computer, securing against software piracy. StudioRIP is freely downloadable from the Internet; it is the hard key which protects the program from piracy. Without a hard key attached to the computer, StudioRIP will run in demo mode. The hard key also holds the license information (i.e. which features of StudioRIP are enabled), and can be easily upgraded.
- **History:** the database where the Print manager application stores the printed jobs in chronological order, grouped in years, months and days. There are two levels of history, one in the *Job browser*, and one in the Print manager (see [5.6.8 Print manager history \(page 63\)](#)).

- **Hot folder:** a folder that is monitored by a program for the appearance of new files. In the StudioRIP system, the Server is watching for PS or PDF files to process (see [3.3 Setting up the hot folders \(page 34\)](#)), and the Print manager is watching for TIFF files to print (see [7.1.3 Special settings \(page 112\)](#)).
- **Ganging:** see *Media saving*.
- **ICC/ICM:** ICM (Image Color Management) is the Microsoft version of the ICC (International Color Consortium) profile. These files describe the color space of one or more devices, and define the way to transform a color from one color space to another. StudioRIP uses color profiles for the Lab/RGB to CMYK conversions in two places: (1) the *Separations profile* of the *Job style* specifies how the incoming colors of the PS/PDF files need to be converted into the CMYK colors of the press, printer or other printing device, and also specifies how the preview system has to show the separated CMYK colors on the screen. (2) the profiling wizards create ICC profiles of the proof printers that will be used in the proofing process. See also [6.2 Color profiles \(page 93\)](#).
- **Imagesetter:** a high quality laser printer, printing on photo-sensitive media (film or paper), used in the pre-press industry. The printed films can then be copied to offset plates or used for other printing technologies.
- **Imposition:** a procedure of arranging pages for printing, typically two or more pages on a sheet, which then will be folded and/or cut.
- **In-rip separation:** the process when the RIP is performing the color separation (typically producing the four – C, M, Y and K – plates from a composite job).
- **JDF:** an industry standard designed to simplify information exchange between different applications and systems in and around the graphic arts industry. StudioRIP uses JDF to transfer ink duct control information to the printing press. See [5.4.2 Ink duct control \(page 56\)](#).
- **Job browser:** the most important docker of the StudioRIP Client, managing the job list, and allowing operations like previewing, deleting or moving the job, sending it for printing, history, etc. See [4.5.1 Job browser \(page 44\)](#).
- **Job style:** specifies how a job will be processed (resolution, screen frequency, dot size, geometry, in-rip separations etc.). Job styles can be saved, and then applied to jobs in many ways. See [6.1.1 Job styles manager \(page 66\)](#).
- **Line screen frequency:** the number of halftone dots per unit, measured in lpi (lines per inch) or lpc (lines per centimeter). A 150 lpi screen has 150 halftone dots on 1 inch.
- **Media saving:** maximizes media use and minimizes wastage by rotating, collecting and arranging the output pages. It can also increase the throughput speed of drum machines. See [6.1.17 Positioning task \(page 85\)](#).
- **Mirror:** the offset technology requires the job to be printed mirrored of filmsetters. Mirrored jobs are also called as *Wrong reading*, while normal jobs as *Right reading*.
- **Moiré:** interference between repetitive patterns, causing a disturbing pattern. In the printing industry typically the halftone screen is causing moiré, interfering with a raster device, image elements or with each other. See [9.2 Understanding moiré \(page 144\)](#).



- **NT system service:** a special way of running programs, available in NT based operating systems (e.g. Windows 8, Windows 7, Windows XP, Windows Server editions). Programs running as system services are launched before any user logons, and can be started and stopped by the *Services* administrative tool. StudioRIP Server and Print manager can run as system services, see *Step 12* of section [2.2.8 Installing StudioRIP](#) *(page 23)*.
- **Overprint:** a technique to avoid thin white lines around design elements, caused by imperfect registration. Typically small black texts are printed over the background, without erasing the colors under the texts as it normally should happen.
- **PDF (Portable Document Format):** a document format, created by Adobe Systems Incorporated, which became now a standard in the printing industry, as well as in home and office use. Gained popularity by portability, small document size, flexibility and by the fact that the Acrobat Reader is freeware.
- **Platesetter:** see *CTP*.
- **PostScript (PS):** a page description language, created by Adobe Systems Incorporated in the 1980's, which became now a standard in the printing industry. Usually design or general use applications create PostScript data, which is then interpreted by the RIP of a printer, imagesetter or CTP.
- **PPD (PostScript Printer Description):** a text file that describes a PostScript printer, used by the PostScript drivers.
- **Preflight warning:** if StudioRIP detects potential problems about a job, it will warn the user by placing an exclamation sign in the job's icon on colored or white background. The description of the warning is also available to the user. See [5.2.3 Preflight warnings](#) *(page 51)*.
- **Print manager:** StudioRIP Print manager is one of the three executables of the StudioRIP package. It is the interface between the StudioRIP system and the print engine. See [2.1 Basic concepts](#) *(page 18)*.
- **Process color:** color that is obtained by the use of the four standard inks (CMYK).
- **Proofer:** a system (typically software and an inkjet printer) that simulates the output of a printing press or another printing device
- **Raster proof:** a proof that offers a perfect (dot for dot) simulation of the job, but has a significantly worse color accuracy than a contone or halftone proof. See [10.2.5 Raster proof wizard](#) *(page 177)*.
- **Rendering intent:** color conversion strategy. Due to the fact that a range of RGB colors are out of the CMYK color space (gamut), these strategies describe how to convert these colors, and eventually their neighbors. The strategies that StudioRIP uses are standard, and are widely available on the web (e.g. <http://www.color.org/profile.html>)
- **RGB:** stands for Red, Green, Blue – the color space of most displays. The colors are achieved by the additive combination of these colors.
- **Right reading:** see *Mirror*.
- **RIP (Raster Image Processor):** a software and/or hardware equipment which translates page description languages (typically PostScript) to raster bitmap data. It may also offer previewing, imposition, job management and other features.

- **Rosette:** a flower-like pattern, produced by the interfering halftone screens (typically cyan, magenta and black). A rosette is consistent if the same pattern is kept on the whole print area, without shifts or moirés.
- **Saddle-stitching:** is used for publications with few pages (usually not more than 32 pages). The pages are collected, stitched on the saddle, and then folded on the saddle. See [8.3.3 Binding tab <page 131>](#).
- **Screening:** a technology used by most print technologies to simulate shades of their colorants. AM (traditional) and FM (stochastic) screenings are the two basic screening technologies. Hybrid screenings are combinations of the two technologies.
- **Separations:** grayscale pages, which are the separated color components of one color page. For example, process color pages are the combination of four separations: cyan, magenta, yellow and black. A pre-separated job contains the separations as independent grayscale pages (i.e. 4 pages for a process color page).
- **Server:** one of the three executables of the StudioRIP package. This is the 'brain' of the system. It has a minimal user interface, and appears as an icon in the system tray. See [2.1 Basic concepts <page 18>](#).
- **Section:** a number of *signatures* in a job. This is typically one (for single-sided work), two (for sheetwise work) or more (for booklets, e.g. 4 sheets folded together will be a section made of 8 signatures).
- **Sheet:** in the imposition terminology means an imposition page.
- **Sheetwise:** double sided (both sides of the sheet will be printed, with different plates).
- **Signature:** in the imposition terminology means an imposition scheme applied to one side of a sheet, which may be repeated over several imposition sheets.
- **Slow scan direction:** the direction the media (capstan) or the carriage (drum) is moving. It is perpendicular to the *Fast scan direction*. Do not confuse it with the feed direction (in case of the drum machines, they are perpendicular).
- **Spectrophotometer:** an accurate instrument that measures color across the visible spectrum and produces data describing the color of a given sample in terms of various parameters (typically Lab or XYZ values).
- **Spot colors:** colors that are obtained by the use of one special ink (e.g. orange) instead of combining process colors (e.g. magenta and then yellow).
- **Stochastic screening:** see *FM screening*.
- **StudioRIP printer port:** a TCP/IP printer port created by StudioRIP, which acts like a USB port. StudioRIP Server captures all the data written to this port by the Windows spooler.
- **Supply cassette:** the cassette the roll fed machine is fed from.
- **System service:** see *NT system service*.
- **Take-up cassette:** used only with imagesetters – a cassette that receives and stores the imaged, but still light-sensitive, film, until the film is pulled out to be processed.
- **TIFF (Tagged Image File Format):** a flexible bitmap format, created by Aldus Corporation in 1986, which has become a standard in the printing industry. Gained popularity due to its flexibility.

- **TIFF catcher:** an application that is able to print TIFF files on a specific print engine (typically CTPs), by exposing a hot folder where RIPs can drop the processed TIFF files.
- **Traditional halftones:** see AM screening.
- **Trapping:** a technique to avoid thin white lines around design elements, caused by imperfect registration, when overprint is not possible (e.g. red object on green background). A thin overlapping border is used between the object and the background, giving a tolerance with the registration errors. Trapping can be created manually (by the designer), by the design application, or by the RIP (in-RIP trapping).
- **Work style:** the work style describes the way the sheet is fed back into the print machine (if it is). There are the following options: Single sided, Sheetwise, Work and turn, Work and tumble. See [8.3.3 Binding tab \(page 131\)](#).
- **Wrong reading:** see *Mirror*