CreoScitex TIFF Downloader 3.0
Reference Guide

Revision History

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01	10-Nov-1999	Jose Delgado	Created for Print Console 1.0
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1. INTRODUCTION

The CreoScitex TIFF Downloader is a software component that takes in pre-screened, one-bit (bi-level) TIFF data and sends raster to a CreoScitex output device as commanded by the device control software. The bi-level TIFF files are supplied by front-end systems such as Prinergy, Brisque, or third party RIPs (via the Creo Recorder Interface). Although the TIFF Downloader has existed in a number of forms and worked in conjunction with a number of different device control software applications (see , section 1), this document describes the latest version of the software: TIFF Downloader 3.0 for Print Console 2.1. For information specific to other versions, refer to previous reference guides.

2. DIFFERENCES BETWEEN TIFF DOWNLOADER 2.2 AND 3.0

TIFF Downloader has undergone a number of changes between version 2.2 (for Print Console 2.0) and version 3.0 (for Print Console 2.1). For example, it now requires two DLL's: DistortRaster.dll and xerces-c_1_0.dll. It also now supports:

- *Independent Mirroring and Rotation* (see "Orientation (Mirror & Rotate)," page 18)
- *Image Centering/Shifting* (see "Image Placement," page 22)
- *Image Cropping* (see "Crop TIFF," page 22)
- *Plate Ganging* (see "Plate Ganging," page 26)
- *Web Growth Compensation* (see "Web Growth Compensation," page 30)
- *Exposure of Entire Media Surface* (see "Image Placement," page 22)

3. HISTORY

TIFF Downloader first appeared as a diagnostic tool with Platesetter Control Software. It provided a way to submit files to an output device using all (what was then) Creo components, making it easier to diagnose problems. These early versions, still used in PCS, were also called the TIFF RIP because the executable file was called tiffrip.exe. With the advent of Print Console, TIFF Downloader became the vehicle by which third parties could submit (TIFF) files to CreoScitex output devices. At this point, a license became necessary when making plates for press. In addition, the name of the executable changed to *tiffdownloader.exe*.

TIFF Downloader Version	ECO #	Release Date	Comments
1.0 (tiffrip.exe)	B918	06 Nov 1997	Part of various kits (19-3145A to 19-3149A, CRI kits)
1.1 (tiffrip.exe)	C265	12 May 1998	Part of various kits (19-3145A to 19-3149A, CRI kits)
2.0 (tiffdownloader.exe)	-	26 June 2000	Part of Print Console 1.0
2.1 (tiffdownloader.exe)	-	26 June 2000	Part of Print Console 1.0.4 and 2.0.1
2.2 (tiffdownloader.exe)	-	12 Mar 2001	Part of Print Console 2.0.2
2.3 (tiffdownloader.exe)	-	01 Apr 2001	Part of Print Console 2.1.0
3.0 (tiffdownloader.exe)	-	?	Part of Print Console 2.1.1

4. TIFF FILE FORMAT

The TIFF (**T**ag **I**mage **F**ile **F**ormat) can be used to store a number of different types of image data, such as monochrome, grayscale, RGB, etc. The TIFF Downloader accepts only monochrome (also called 1 bit and bi-level) TIFF files that contain a single separation. All TIFF images are stored with data that describes certain aspects of the image, such as resolution (in each axis), image name (interpreted by the TIFF Downloader as the separation name), and image polarity—that is, inverted or not inverted.

The image data in each TIFF file is usually divided into either strips or tiles (Figure 4.1). Each strip or tile is then compressed individually. Programs are able to manipulate the image data efficiently because it is divided into strips or tiles. Occasionally a file's entire image data is stored in a single strip. These single strip files, sometimes called "whole image format" files, can take significantly longer to process.

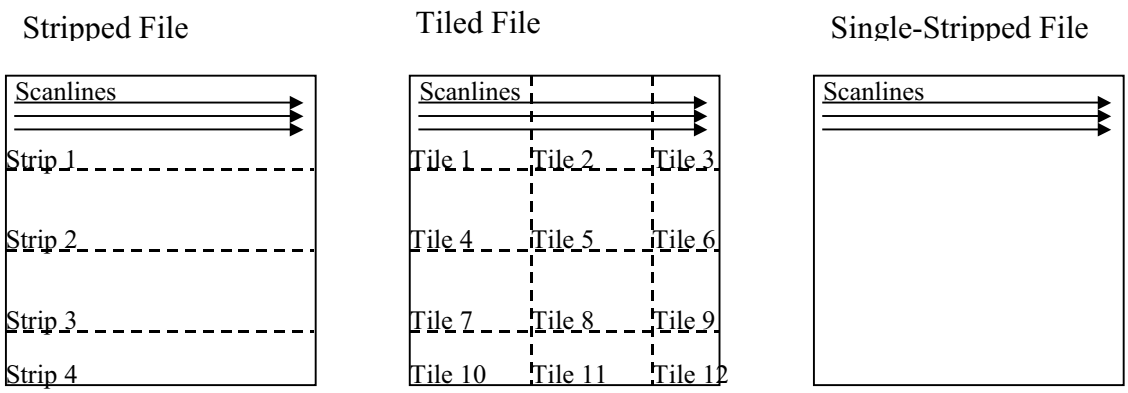


Figure 4.1: Stripped, Tiled, and Single-Strip Files

The TIFF Downloader conforms to revision 6.0 of the TIFF specification. The following table outlines the TIFF settings accepted by the TIFF Downloader (refer to Appendix A on page 46 for more details):

TIFF Option	Values Supported
BitsPerSample	One (also known as bi-level or monochrome TIFF)
Compression	Uncompressed, G3, G4, Modified Huffman, Packbits, Flate (otherwise known as Zip or Zlib), LZW
Byte Ordering	Little Endian or Big Endian (i.e. Intel/PC or Motorola/Mac)
Data Organization	Tiles, Strips, Single Strip
ImageWidth, ImageLength	Arbitrary, does *not* need to be a multiple of 8, 16, 32, etc.
File Size	4GB file size limit, imposed by the TIFF specification (however the image size *can* exceed 4GB if compressed)
PhotometricInterpretation (image polarity)	MinIsWhite (normal), MinIsBlack (inverted)
ResolutionUnits	Inches or centimeters
Resolution	Any resolution supported by the output device, can be different resolution in each axis
Orientation	Only type 1 (one) is supported (0th row is top, 0th column is left)
ImageDescription (tag 270)	Passed to Print Console as the Separation Name (or RipColor) and displayed in log file
PlanarConfiguration	Assumed to be one

5. TIFF DOWNLOADER CONCEPTUAL MODEL

We have optimized the TIFF Downloader's performance by assigning its tasks to a number of different threads for each job. A thread is like a mini-program that performs specific functions independently. On multiple CPU systems, the operating system (Windows NT or 2000) runs different threads on different CPU's. This allows the TIFF Downloader to read

and decompress one part of the input file at the same time that it is writing another part of the file out to the device. In this way, the TIFF Downloader can potentially image files much faster on multiple CPU systems.

Figure 5.1 shows a conceptual model of the TIFF Downloader's threads and data flow when imaging a single file with no web growth or tinting. A number of "auxiliary" input threads are started by the "main" input thread, depending on the number of CPU's in the system and the **/auxthreads** command line parameter. The main input thread steps through the input file, assigning each auxiliary thread the next required parts of the input file. The auxiliary threads read and decompress the file data and place it in the input buffers. Each auxiliary input thread has a set of buffers (2 by default) that it fills, so that it can be filling one buffer while the other is being emptied by the clip thread.

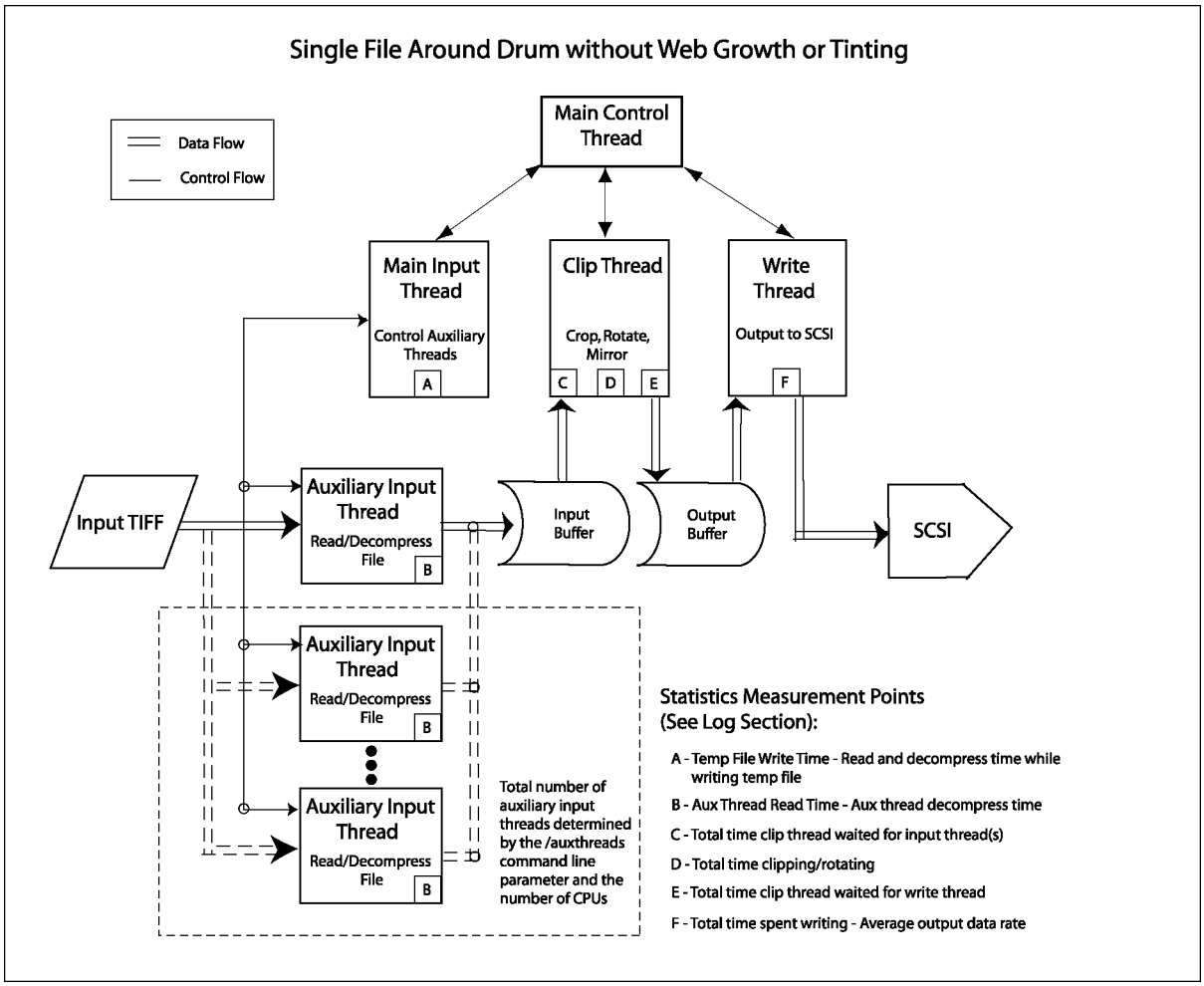


Figure 5.1

The clip thread, which is responsible for sizing, rotating and mirroring the image data, is fed the input buffers in the correct order by the main input thread. The clip thread places the sized and oriented data in the output buffers, which are then copied to the SCSI port by the write thread. There is more than one output buffer (2 by default) so that the clip buffer can be filling one buffer while the write thread is emptying the other.

Note that if the reading and decompressing of an input file is the system bottleneck, multiple auxiliary threads (that is, **/auxthreads** set to more than one) running on a multiple CPU

system will likely significantly improve performance. This is because more than one part of the input file is read and decompressed at one time. However, if multiple auxiliary threads are specified on a single CPU system, no performance improvements are gained because the multiple threads must share the single CPU. In fact, the TIFF Downloader will ignore the request for multiple auxiliary threads in this case and only use one input thread.

Figure 5.2 shows the TIFF Downloader when imaging a single file with web growth. This example is very similar to the previous example, except that it shows the web growth thread (sometimes referred to as the "distort" thread) and an extra set of buffers between the clip thread and the write thread. This is very similar to the scenario when tinting is enabled: a separate tint thread and set of buffers is added just before the write thread.

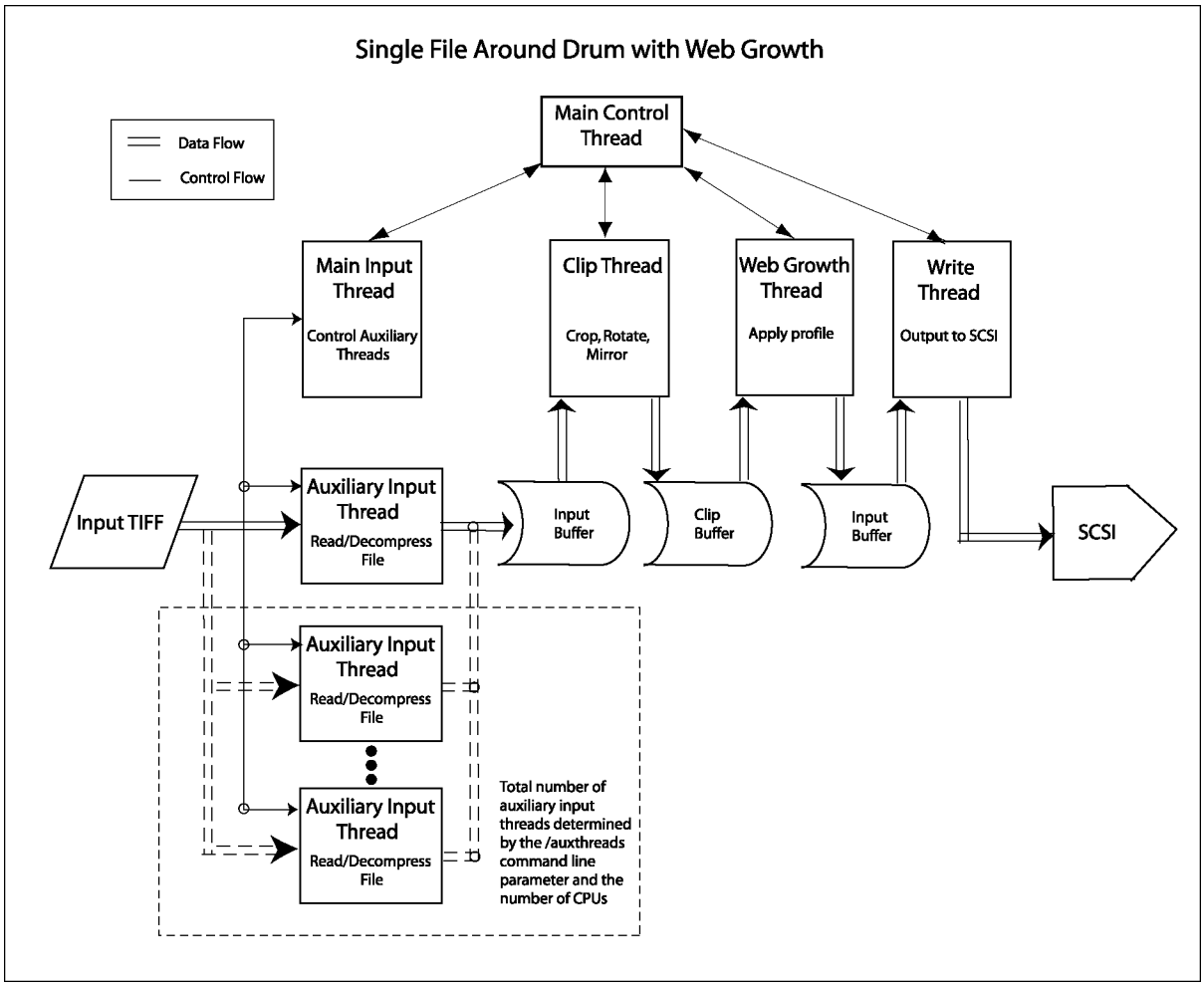


Figure 5.2

Figure 5.3 shows the TIFF Downloader when ganging two files around the drum with two auxiliary threads specified. The TIFF Downloader starts a "main" input thread for each input file, and each main thread starts at least one auxiliary thread. The TIFF Downloader starts more auxiliary threads if specified in the command line using the **/auxthreads** command, and if the required number of CPUs are present. In this example, the system must have 4 CPUs: one for each auxiliary thread. The clip thread takes the input buffers from each input thread and combines them into a single image. The write thread simply treats this data like a single file image.

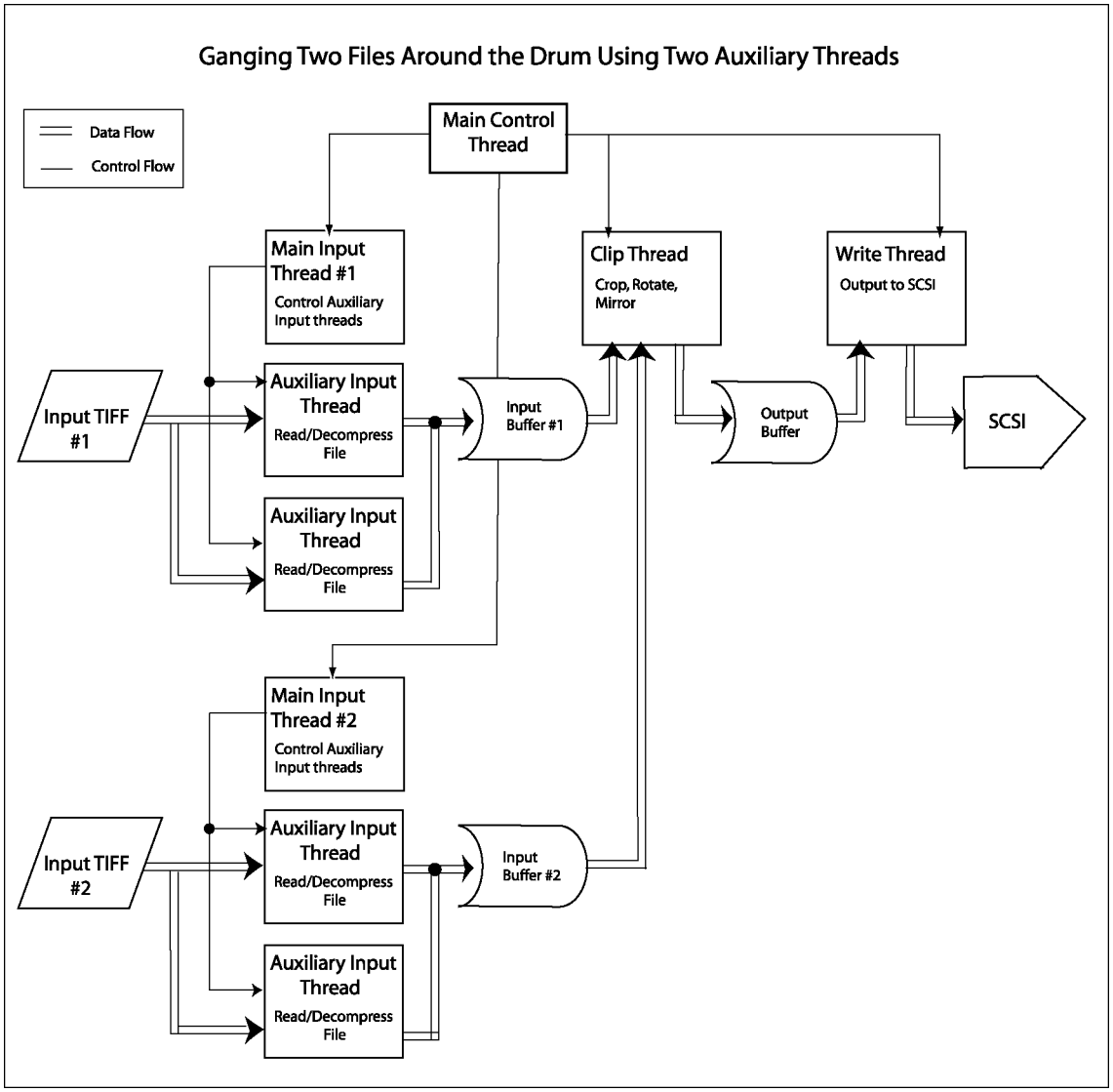


Figure 5.3

6. CONFIGURING TIFF DOWNLOADER

TIFF Downloader 3.0 is a new version specifically for Print Console. The name of the executable is **tiffdownloader.exe** and by default is located in **E:\Printconsole\bin**. This version requires the following DLLs to be present in the path, preferably in **\Printconsole\bin: DistortRaster.dll**, **xerces-c_1_0.dll.** These DLL's are installed automatically.

If you selected the TIFF Downloader option when you installed Print Console, TIFF Downloader starts automatically when the Print Console software runs.

The Print Console installation program creates the following command line in the **PrintConsole/bin/begin.inf** file:

"tiffdownloader /auxthreads4 /sws1048576 /tib70" /unique /noconsole /min /exit 0 /restartdelay 10

Parameters are listed below. A full description for many parameters follows this list:

- **/le<float>**—no longer valid in the command line; now specified in the **Device Margins** dialog box in the **Service** pane.
- **/te<float>**—no longer valid in the command line; now specified in the **Device Margins** dialog box in the **Service** pane.
- **/transform**—no longer valid in the command line; see the **TIFF** tab in the **Print Setups** pane.
- **/ib<int>**—force input buffer size in MB
- **/tib<int>**—force input buffer size in MB when rotating by 0 or 180 degrees (For Print Console 2.0, force the input buffer size when transforming)
- **/ob<*int*>**—no longer valid
- **/inbuffers<*int*>**—specify number of input buffer per image, defaults to 2.
- **/scsibuffers<*int*>**—specify number of output buffers, defaults to 2.
- **/clipbuffers<*int*>**—specify number of intermediate buffers, defaults to 2.
- **/noxymatch**—obsolete: X & Y resolutions no longer have to match by default.
- **/originalg4**—use fixed version of original libtiff G4 decoder
- **/bitmap**—write output to a bitmap file instead of SCSI port (for testing)
- **/regver2.0**—enables the TIFF Downloader to work with Print Console 2.0.x
- **/regver1.0**—obsolete
- **/tiff**—write output to TIFF file instead of SCSI port (for testing). Default compression is G4. See also, **/outzip** and **/outnc**
- **/simscsi**—do not output to SCSI port, delay approx. transfer time (for testing)
- **/testscsi**— test SCSI connection between TIFF Downloader and device on start-up. The startup test is disabled by default.
- **/auxthreads<*n*>**—run more than one input thread per file, where ***n*** represents the number of auxiliary threads to spawn.
- **/sws<*size in bytes*>**— size of the output image data blocks sent to the SCSI port
- **/outzip**—if /tiff is enabled, specifies that the output TIFF file compression scheme should be Zip (i.e. Flate or Zlib).
- **/outnc**—if /tiff is enabled, specifies that the output TIFF file should not be compressed

- **/testlzw**—no longer needed, LZW is enabled by default
- **/file=*filename***—instructs the TIFF Downloader to operate in stand-alone mode. A single plate is imaged using the <filename> as the input TIFF, and then the TIFF Downloader exits. The TIFF Downloader uses parameters from a setup file if **/setup=***filename* is specified; otherwise, it uses default parameters.
- **/setup**—when no filename is specified, the TIFF Downloader creates (or overwrites) a default setup file, **TDLSetup.txt**, in the current directory and exits (see **/setup=*filename***).
- **/setup=*filename***—instructs the TIFF Downloader to operate in stand-alone mode using parameters from the specified setup file. The TIFF Downloader images a single plate and then exits. The setup file must have been created by the /setup command. Note that the filename specified by **/file=** overrides the filename in the setup file when not ganging.
- **/statsfile=*filename***—appends timing statistics from each image to the end of the specified file. If no path is specified, the file is assumed to be in **PrintConsole\bin**. If the file does not already exist, it is created. Check the size of this file periodically because the TIFF Downloader will never delete or rename it.

Although most of these command line switches are not normally used, they may be useful for testing or for special cases. The following sections explain some of the switches in more detail.

/ib<*int*>

Force the size, in megabytes, of the input data buffer when not transforming. If not specified, the following default sizes are used:

- Stripped files: 1200 scan lines (approximately 5 swaths)
- Tiled files: 1200 scan lines (approximately 5 swaths), rounded up to the nearest tile

/tib<*int*>

Force the size, in megabytes, of the input buffer when rotating by 0 or 180 degrees (for Print Console 2.0: input buffer size when transforming). If not specified, the following default sizes are used:

- Stripped files: 30MB
- Tiled files: one column of tiles

/originalg4

The original G4 decoder will be used instead of the default G4 decoder (the default decoder is known as the “Dave Hylands” G4 decoder).

/inbuffers<*int*>

Specify the number of input buffer per image, defaults to 2. Increasing this value increases memory usage, but also increases the amount of image data that is decompressed while the device is loading. This can therefore decrease the overall image time; however, the most

gains will be achieved by increasing the output buffers (see **/scsibuffers<*int*>**). Note that if **/scsibuffers<*int*>** is increased, **/inbuffers<*int*>** does not necessarily have to be increased to match it.

/scsibuffers<*int*>

Specify the number of output buffers, defaults to 2. Increasing this value will increase memory usage, but will increase the amount of image data that is completely processed while the device is loading. This can therefore decrease the overall image time.

/clipbuffers<*int*>

Specify the number of intermediate buffers, defaults to 2. Intermediate buffers are only used for secondary processing such as web growth or Thermoflex tinting. At this point, increasing **/clipbuffers** is not expected to provide an improvement in overall image time.

/bitmap

The TIFF Downloader will write image data to a bitmap file (named ******input filename.***bmp**) instead of the SCSI port. This is useful for debugging TIFF files. Note that you will need a viewer capable of displaying huge bitmap files. The **/tiff** option is more useful, though, since it will produce a compressed file, plus viewers that are capable of reading large TIFF files are more readily available.

/tiff

The TIFF Downloader will write image data to a TIFF file (named ***.out.tif**) in the **\PrintConsole\bin** directory instead of to the SCSI port, which is useful for debugging TIFF files. Note that you will need a viewer capable of displaying huge TIFF files, such as the CreoScitex Copydot Toolkit. See also, **/outzip** and **/outnc**.

/outzip

If **/tiff** is enabled, this option specifies that the output TIFF file compression scheme should be Zip (i.e. Flate or Zlib). Note that at the present time the CreoScitex Copydot Toolkit cannot read files compressed with this scheme. However, this option is useful for creating test files that will be used as input for the TIFF Downloader.

/outnc

If **/tiff** is enabled, specifies that the output TIFF file should not be compressed. This can result in very large files (a 32”x44” file will be about 1 GB).

/simscsi

The TIFF Downloader will not output the image data to the SCSI port, but will instead simulate the amount of time it would take to write the data.

/help

Displays the list of command line options.

/testscsi

Enables the test of the SCSI connection upon TIFF Downloader startup (though disabled by default because Print Console 2.1 performs this test). If the TIFF Downloader cannot locate the device via SCSI, Print Console displays the "Unable to locate Creo output device on the SCSI bus. Please turn on the Creo output device or check the SCSI cabling" message every 30 seconds until the device is found.

/auxthreads<*n*>

The TIFF Downloader can start as many as four auxiliary threads to process a file, which improves throughput on multi-CPU systems driving fast devices. The <***n***> represents the number of threads to spawn: four is the maximum; the default is one. The total number of auxiliary threads actually spawned cannot exceed the number of CPUs installed on the system. If more threads are specified than CPUs installed, the TIFF Downloader will adjust the number of auxiliary threads and display a warning.

A "thread" or "auxiliary threads" describes sub-tasks of a job that are processed in parallel in order to increase throughput.

Multi-threaded input does not work for single stripped files (also known as "whole image" stripped files) with rotations of 90 and 270 degrees. The TIFF Downloader automatically reverts to a single input thread without reporting an error so that the user does not need to accommodate this limitation. This is due to the difficulty in randomly accessing single stripped files (another reason this file type should be avoided). The TIFF Downloader can, however, use multi-threading on single stripped images rotated 0 or 180 degrees since these files are first re-written as tiled files, which can then be multi-threaded.

CAUTION: While configuring the TIFF Downloader to use multi-threads speeds up throughput, it can also negatively impact the performance of other applications running on the same workstation.

/sws<*size in bytes*>

This option specifies the size of the output image data blocks sent to the SCSI port. The default is 65536, which was chosen because of a limitation with NT 3.51. This limitation appears to have been fixed, and increasing this value can improve SCSI throughput, particularly when outputting to fast devices. Note that this option has no effect on memory usage.

/file=*filename*

Instructs the TIFF Downloader to operate in stand-alone mode. Do not use this option when connecting to Print Console or the MiniDriver. A single plate will be imaged using *filename* as the input TIFF, and then the TIFF Downloader exits. The TIFF Downloader users parameters from a setup file if **/setup**=*filename* is specified; otherwise, it uses default parameters.

/setup

When this option is specified with no filename, the TIFF Downloader creates or overwrites the default setup file, **TDLSetup.txt**, in the current directory (usually **PrintConsole\bin**) and

exits (see **/setup**=*filename*). Do not use this option when connecting to Print Console or Mini-Driver.

/setup=*filename*

Instructs the TIFF Downloader to operate in stand-alone mode using parameters from the specified setup file. A single plate is imaged and then the TIFF Downloader exits. The setup file must have been originally created by the **/setup** command. If no path is specified, the file is assumed to be in the current directory (usually **Print Console\bin**). A filename specified by the **/file**=*filename* command overrides the filename in the setup file when not ganging. Do not use this option when connecting to Print Console or Mini-Driver.

/statsfile=*filename*

Appends timing statistics from each image to the end of the specified file. If no path is specified, the file is assumed to be in the current directory (usually **PrintConsole\bin**). If the file does not already exist, it is created. The size of this file should be checked periodically, since the TIFF Downloader will never delete or rename this file. Note that this file can be imported into Excel by opening the file and using the Text Import Wizard that should start automatically: choose "Delimited" and a colon (:) delimiter.

7. PERFORMANCE GUIDELINES

While the TIFF Downloader has been designed to perform optimally in as many situations as possible, there are some combinations of input files and settings that do not perform as well as others. Following are some performance guidelines:

- As described in Section 12, rotating non-tiled files by 0 and 180 degrees causes the TIFF Downloader to rewrite the input file to a temporary tiled file. Therefore, "pre-rotating" an image by 90 degrees when it is created, and then sending it through TIFF Downloader with a 90 degree rotation setting results in faster output.
- As described in Section 12, the TIFF Downloader cannot process single-stripped files as efficiently as tiled or multi-stripped files. In particular, the following rotation and mirror combinations perform very poorly:
    - Rotate 90°, mirror along drum
    - Rotate 270°, no mirror
    - Rotate 270°, mirror around drum

8. LICENSING

TIFF Downloader is licensed software. It will successfully register with Print Console and output data regardless of whether the license key is there or not. However, if the key is not there, then TIFF Downloader superimposes a 1 x 5 inch "CreoScitex Diagnostic Tool" label (up to 3 times, depending on the media size) across the imaged output media.

To obtain a license key, contact a CreoScitex representative and supply the TIFF Downloader System ID number (displayed on the Licenses tab of the Preferences tab in the Configuration

screen) and the customer's sales order number. (These numbers are converted into a license key using a special software tool used by Production.)

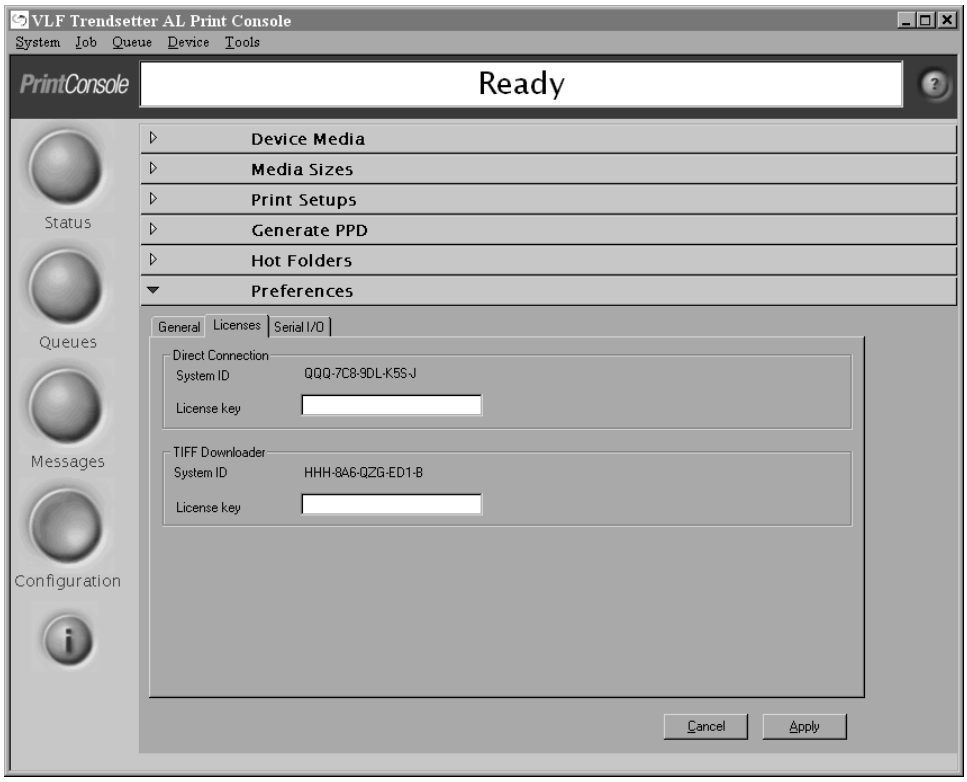


Figure 8.1

To enable the license, enter the supplied license key into the Licenses tab of the Preferences pane on the Configuration screen. Note that the key is case sensitive and must be entered in uppercase characters. Also, the "-" (en dash) characters must be included. Once entered, the key will take effect on the next image.

The TIFF Downloader System ID is based on the physical Ethernet address of the workstation's network card. The software that generates this ID queries the network card using the NetBEUI protocol, therefore NetBEUI must be installed on your server. If you change the network card you must get a new license key based on the new TIFF Downloader System ID.

When imaging, the TIFF Downloader will output one of the following status messages to the Print Console "History" window:

- "Creo TIFF Downloader Started – Diagnostic License" if the license key *has not* been entered, or
- "Creo TIFF Downloader Started – Full License" if the license key *has* been entered

9. COMPRESSION

It is recommended that all image files be compressed. We recommend using either G4 or LZW. Some types of files (like those with stochastic screening, for example) *may not* compress properly with the G4. The TIFF Downloader supports Flate (also known as Zip or

Zlib) compression, and although not widely supported at the present time, it performs well with most file types.

If the new G4 decoder cannot process a particular G4 file, the original G4 decoder *may* be able to. Enable the original G4 decoder via the appropriate **begin.inf** file command line using the **/originalg4** switch as shown below (note the placement of the quotation marks):

"tiffdownloader /auxthreads4 /sws1048576 /tib70 /originalg4" /unique /noconsole /min /exit 0 /restartdelay 10

Note: TIFF files cannot be larger than 4GB. However, the uncompressed image size *can* be larger than 4GB, therefore, large images (like larger VLF images) *must* be compressed.

The following are the standard TIFF compression schemes available in the TIFF Downloader:

- Uncompressed
- CCITT G3 fax encoding
- CCITT G4 fax encoding
- LZW
- Packbits (a form of Run Length Encoding (RLE), good only for sparse images, i.e. images with lots of white space; poor for screened images)
- Modified Huffman (a form of Run Length Encoding (RLE), good only for sparse images, i.e. images with lots of white space; poor for screened images)
- Flate, also known as Zip or Zlib, not officially part of the TIFF specification, but gaining acceptance

10. TIFF FILE PROCESSING WITH TIFF DOWNLOADER AND PRINT CONSOLE

10.1 TIFF Files And Proofing

When submitting files for proofing either through hot folders or through the **Submit file** option in the Print Console **Job** pane, each file will be displayed as a separate job in the **Pending** queue. These files must be "grouped" to form a single proof job, and are grouped into the default color order for that device medium, as defined in Print Console's **Device Media** pane on the **Configuration** screen. Ensure that this is the order in which you have loaded the cassette. (Reorder job separations as necessary.)

The colors assigned to these separations–and the order in which they are processed–follows a number of rules, as described in the following paragraphs.

- If the print setup used has a separation list (a predefined order for the separations) then this will be used to initialize the job, but since one-bit TIFF files contain only one separation, you would not use a print setup with a separation list to process them.

- If the print setup has no separation list, and if the submitted files have a color designation in their file names, for example *"<filename>-<sep>*.tiff" or "*<filename>.<sep>*.tiff." (where "*<sep>*" indicates a color, such as "C" for cyan), separations will be assigned device color metadata based on the *<sep>* value. When submitting files that do not have separation indications in their name, the files will show in the pending queue with no device color metadata, and no graphical color icons are assigned to the separations.

- Once the job is approved and moves to the Active queue, Print Console searches the "Image Description" tag for the RIP color or gets the RIP color directly from the RIP. Print Console tries to look up this RIP color in the Proof Color Table to find what device color the RIP color is mapped to. If there is a color mapping, Print Console uses this when processing the job.

  Print Console does not override separation metadata that has been pre-defined in the TIFF file because using the existing separation metadata mapping gives you the time necessary to preload the media into output device. Therefore, while the RIP is RIPing the job, you can preload the device with the proofing media, for example, Imation (Black).

- If there is no color separation information in the job's header and if no color separations have been configured in the applied print setup, Print Console looks at the file extension on the job, and if Print Console can read the extension and map it to an existing device color, listed in the **Device Media** pane, it determines the color mapping from the extension. Print Console does not try to look for a color mapping in the Proof Color Table. If Print Console cannot map the extension color to a device color, Print Console displays a suspend prompt asking you to select a device color.

- If none of the above conditions are met, Print Console brings up an operator prompt when the separation goes to the device. This operator prompt asks the user to map the RIP color separation to a device color.

The following is an example of a TIFF file with no image description tag:

```
TIFF Directory at offset 0x8
  Subfile Type: (0 = 0x0)
  Image Width: 68448 Image Length: 92413
  Resolution: 2400, 2400 pixels/inch
  Dimensions: 28.52 x 38.51 inches
  Bits/Sample: 1
  Compression Scheme: none
  Photometric Interpretation: min-is-white
  Samples/Pixel: 1
  Rows/Strip: 1
  Planar Configuration: single image plane
Strip 0:
```

...and here is an example of a TIFF file *with* the image description tag:

TIFF Directory at offset 0x48832c
Image Width: 69600 Image Length: 48000
Resolution: 2400, 2400 pixels/inch
Dimensions: 29.00 x 20.00 inches
Bits/Sample: 1
Compression Scheme: CCITT Group 4 facsimile encoding
Photometric Interpretation: min-is-white
Image Description: "Cyan"
Orientation: row 0 top, col 0 lhs
Samples/Pixel: 1
Rows/Strip: 512
Planar Configuration: single image plane
Strip 0:

10.1.1 Print Setup For a Proof Using TIFF Downloader

The graphic below shows a print setup configured to use the TIFF Downloader with 4-up proofs. Note that the **Auto Approve** check box is not selected.

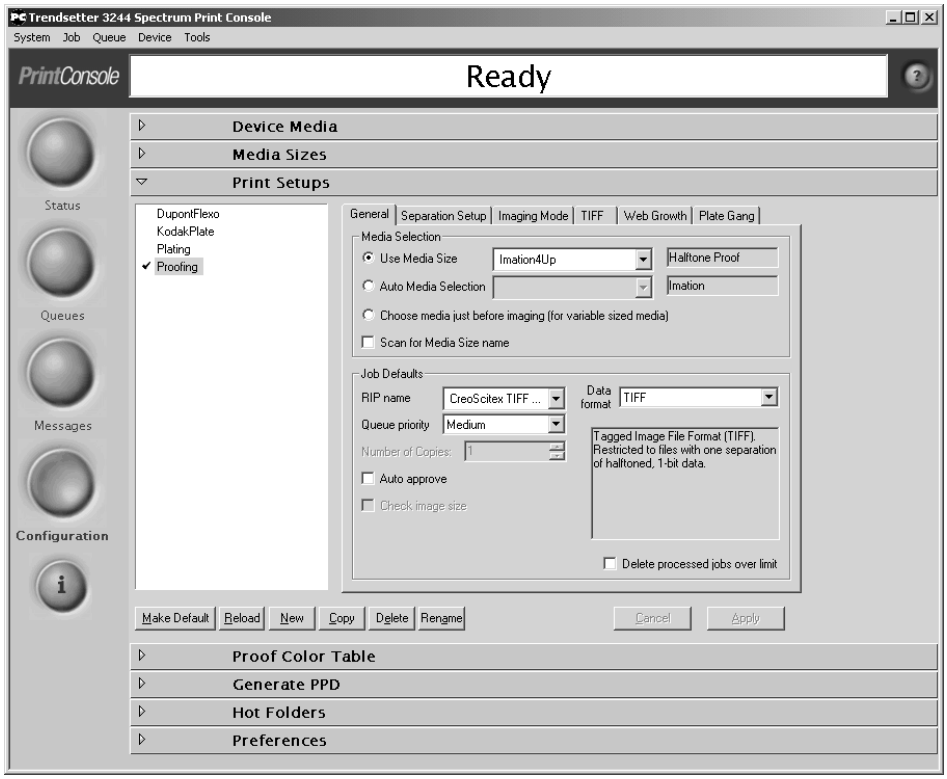


Figure 10.1

10.2 TIFF Files And Plating

When submitting files for plating either through hot folders or through the **Job** menu's **Submit file** option, each file will display as a separate job in the Pending Queue.

Normally the order in which these files are processed is not important, but they can be manually moved up or down in the Pending queue, and their priorities can be changed.

As a general rule plates are submitted through a hot folder that has a print setup with the "Auto approve" option set, meaning there is no need for manual intervention.

Again, the color assignment for display purposes is based on the files having the strings "C", "M", "Y", or "K" (minus the quotation marks) in their file names. Once the job is approved, the color icon will not change, but the color name may change based on the "Image description" tag.

Proof color mapping is not applicable to plates.

11. TIFF DOWNLOADER ORDER OF OPERATIONS

The TIFF Downloader can perform a number of different manipulations to a file, including rotation separate from mirroring, centering, cropping, web growth compensation, and plate ganging. If all options are selected, the TIFF Downloader rotates (page 20), mirrors (page 20), crops (page 22), positions (image shift or centering, page 22), and either applies web growth compensation (page 30) or gangs the images (page 26). Although the TIFF Downloader can, in theory, apply web growth to plates that have ganged files, these features are currently mutually exclusive. That is, if you select one, the options on the other tab are disabled.

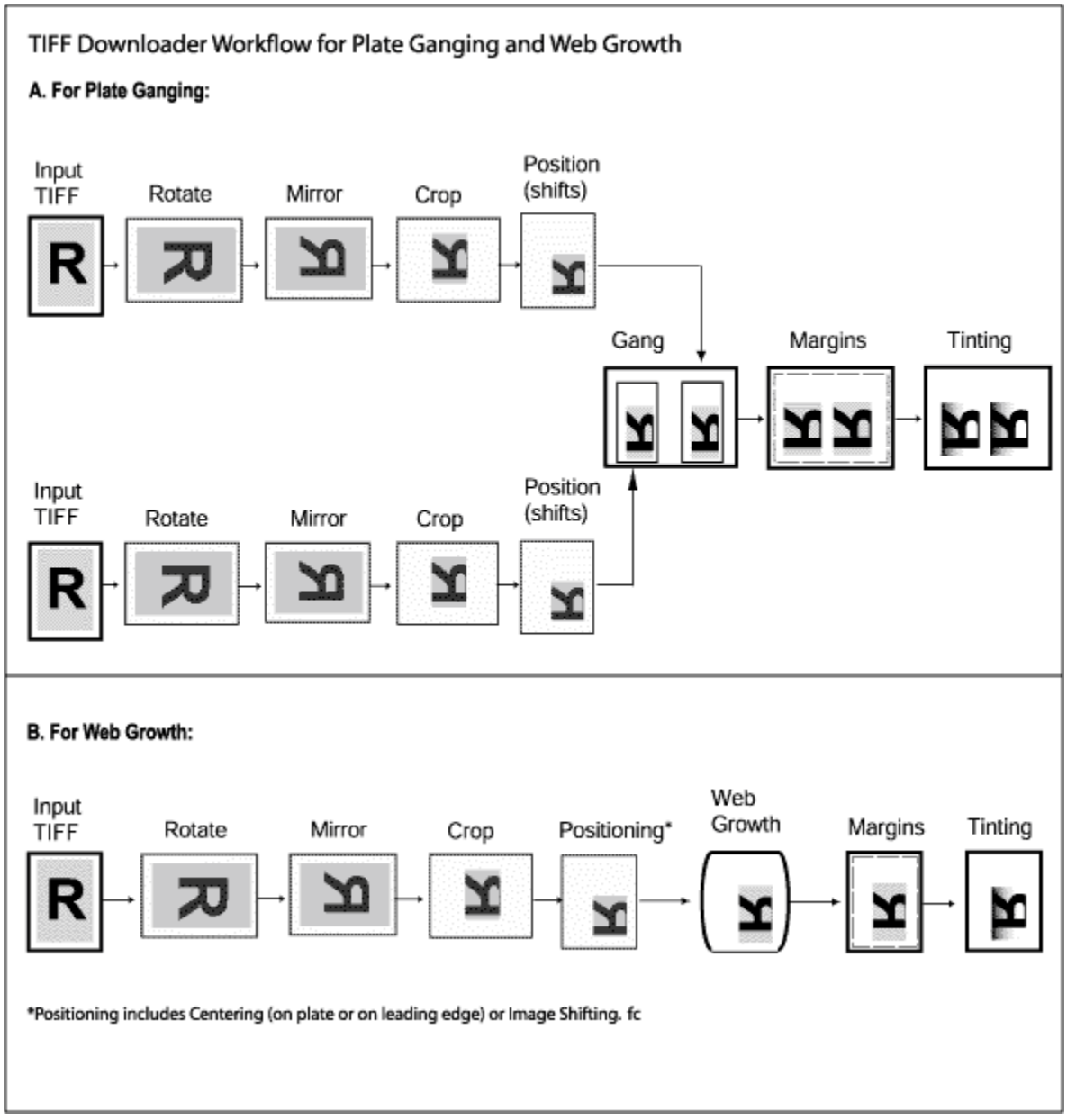


Figure 11.1

12. ORIENTATION (MIRROR & ROTATE)

The TIFF Downloader allows you to mirror and/or rotate images that are not oriented properly by selecting the appropriate option in Print Console's **Print Setup** pane (Figure 12.1). The rotation and mirror options in the TIFF tab are relative to the file's orientation from the originating software, as seen in a standard TIFF viewer. If both options (mirror and rotate) are selected, the rotation is performed before the mirroring.

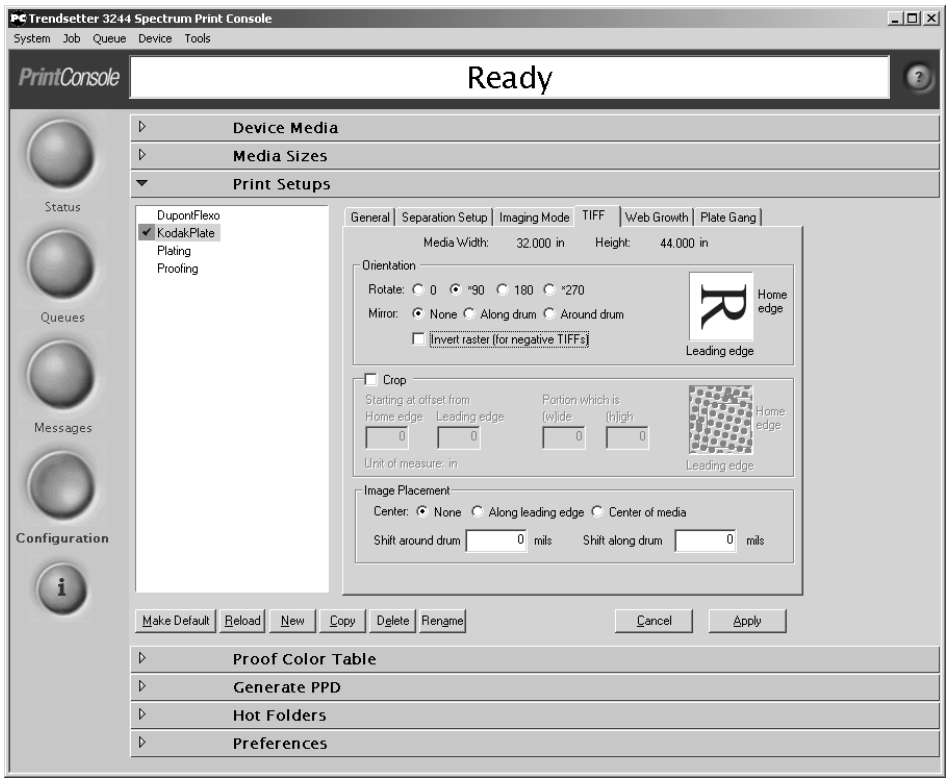


Figure 12.1

Note: The **TIFF**, **Web Growth**, and **Plate Gang** tabs are only available when you have CreoScitex TIFF Downloader installed and licensed. In addition, **TIFF Downloader** must be selected in the **RIP name** box on the **General** tab in the Print Setups pane or Job Properties dialog box, and the web growth and plate ganging options must be enabled on the **Service** pane.

Because the TIFF Downloader translates the rotation and mirroring instructions from Print Console while compensating for the default mirroring and rotation in the device, certain settings have faster throughput than others. For example, if the user selects a 0 degree rotation and selects no mirroring, the TIFF Downloader rotates the scan lines by 270 degrees and then mirrors them to correctly output the file. On the other hand, if the rotation angle is 90 degrees and mirroring around the drum is selected, the TIFF Downloader passes the scan lines to the device un-rotated and un-mirrored because the device automatically rotates and mirrors the image by default (see Figure 12.3).

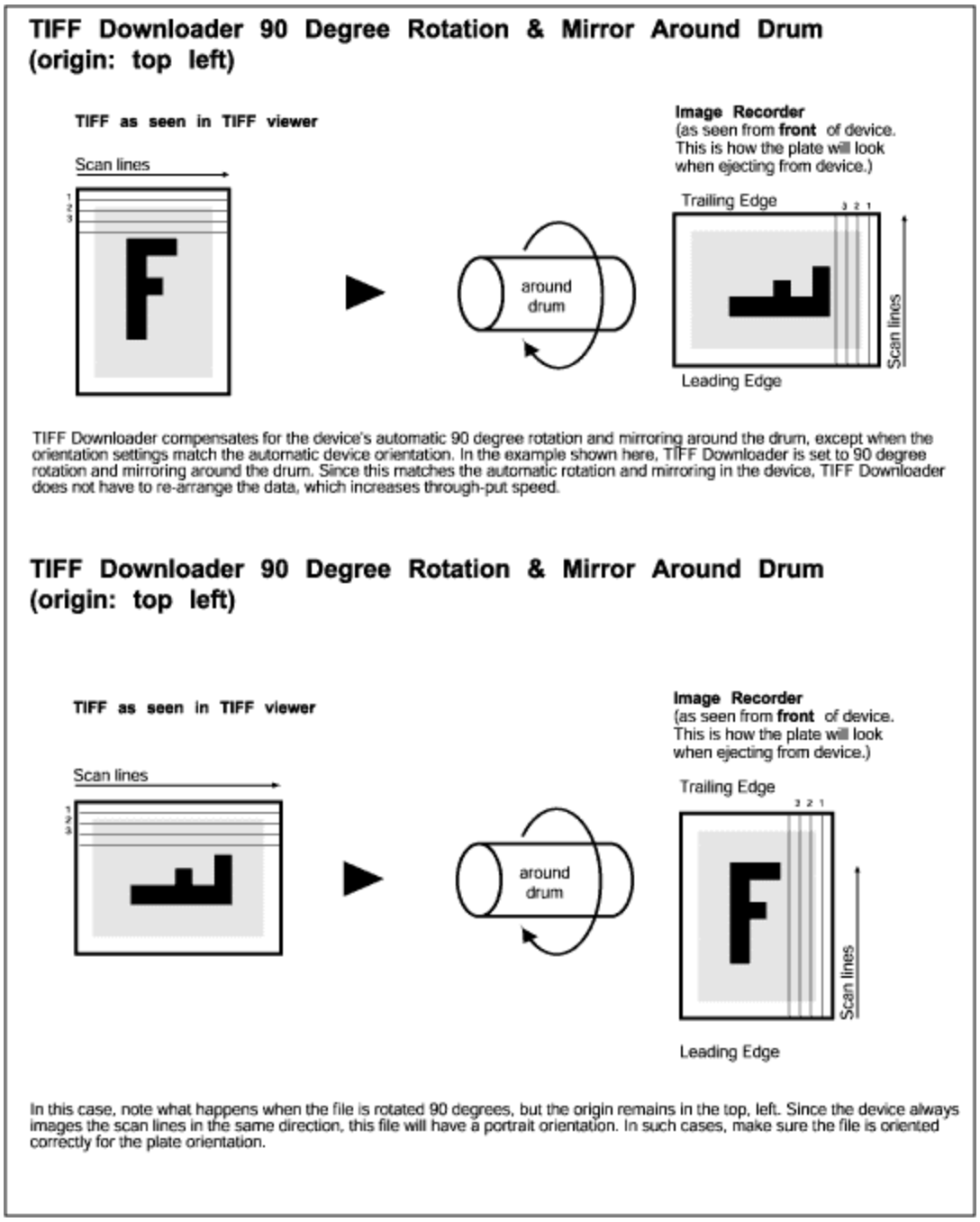


Figure 12.3

When using TIFF Downloader for both proofs and plates, the RIP setup (mirror and rotate) should ***always*** be the same. Print Console print setups for proofs (and only proofs) should have the **Around Drum** mirror option unchecked. The most efficient setting for proofs and plates is either 90-degree or 270-degree rotation. These require the fewest internal manipulations by the TIFF Downloader.

Remember the following rules when orienting a file:

- For fastest throughput, configure the RIP to rotate the file 90 degrees and mirror it in the around the drum direction. Keep this setting for both plates and proofs.

- In Print Console, set the orientation options on the TIFF Downloader tab to rotate ***90** degrees and mirror **Around Drum** for fastest throughput.
- For proofs (when the RIP has oriented the file correctly), select the **None** mirroring option.
- If the file is not oriented correctly in the RIP for optimal throughput in Print Console, use the TIFF Downloader orientation options to re-orient the file. Be aware, though, that these options (specifically 0 and 180 degree rotations) can affect system performance.
- If you have to re-orient the RIP, use the following as a guide:

    1. Match the orientation of the "R" graphic on the TIFF Downloader tab to the orientation of the file as it comes from the RIP (as viewed in a TIFF viewer such as Copydot Toolkit).

        For example, if the file from the RIP is wrong-reading and rotated 90 degrees, select ***90** rotate and **Along Drum** mirror to match the file's orientation.

        Note: A number of different rotation and mirroring combinations can achieve the same effect. For example, **0** rotation and **Around Drum** mirror achieves the same orientation. As long as the orientation of the "R" matches the orientation of the file from the RIP, the file will orient correctly. Orientation options other than the optimal settings (90 & 270) slow down the system.

    2. If you are outputting a proof and the orientation in step one requires either the **Around** or **Along drum** mirror setting, select the **None** setting. If the orientation in step one requires the **None** setting, select either the **Around** or **Along drum** mirror setting. If you are outputting a plate, go to the next step.

    3. Confirm that the image size fits on the plate or proof and does not require a further 90° rotation so that the leading edge of the TIFF image aligns with the leading edge of the plate.

12.1 Rotation

The TIFF Downloader's rotation feature produces a 0, 90, 180, or 270-degree rotation of the image data. This feature can be useful if the image file has not been pre-rotated by the RIP to conform to CreoScitex's output devices. Select this feature via the TIFF tab in the **Print Setups** pane and can be used in conjunction with the mirroring function. If both options (mirror and rotate) are selected, the rotation is performed before the mirroring. To see how mirroring fits into the TIFF Downloader's workflow, see the "TIFF Downloader Order of Operations" section on page 17.

Stripped files with rotation set to 0 or 180 degrees will take longer to output since they must first be re-written to a temporary tiled file. These files will be delayed at the start while the TIFF Downloader writes the temporary file. The delay will be approximately 1 to 5 minutes for a gigabyte image (i.e. 32"x44" at 2400dpi).

The temporary file will be written to a folder called "**TDLTemp**," and both will be deleted at the end of the image. To determine the path of the temporary folder and file, the TIFF Downloader first checks for the following registry entry:

..\TiffDownloader\ TransformTempFolder

If this entry doesn't exist, or there's insufficient space in the specified directory, the TIFF Downloader tries the current directory (usually **PrintConsole\bin**). If this directory does not have enough space, the TIFF Downloader tries the input file's directory (only local directories are considered). The image will ultimately fail if the TIFF Downloader cannot find a location with sufficient disk space.

Note that for optimal performance, it is preferable for the temporary directory to be on a different drive than the input file.

Tiled files do not require this temporary file and therefore will not be delayed.

The asterisk on the TIFF tab indicates the rotations that provide the fastest throughput. These orientations are faster because the TIFF Downloader has to perform fewer (if any) manipulations to output these files correctly.

12.2 Mirror

The mirror option mirrors data either around the drum axis (scan lines are mirrored, but not the order of the scan lines) or along the drum axis (order of the scan lines are reversed, but each scan line is not mirrored). You can select the mirror feature via the **TIFF** tab in the **Print Setups** pane.

TIFF Downloader can mirror the image data with little degradation in performance. The leading and trailing edge margins are applied after the image is mirrored. In other words, the leading edge margin still applies to the leading edge of the plate. If both options (mirror and rotate) are selected, the rotation is performed before the mirroring. To see how mirroring fits into the TIFF Downloader's workflow, see the "TIFF Downloader Order of Operations" section on page 17.

13. CROP TIFF

Using the Crop TIFF options on the **TIFF** tab in the **Print Setup** pane, you can define a rectangular portion of the input raster to image on the plate, which in effect means you can crop the image. To define the portion of the TIFF that is to be imaged, first output a plate without applying the cropping feature ("Crop TIFF" not checked). Measure the distance in from the home edge of the plate to the point where you want to begin imaging the file. Enter this value in the **Home Edge** box. Continuing in the same direction, measure from that point to the point where you want to stop imaging, which is considered the width of the image in this context. Enter that value in the **(w)ide** box. Repeat the same procedure from the home edge and enter the values in the **Leading Edge** and **(h)igh** boxes, respectively.

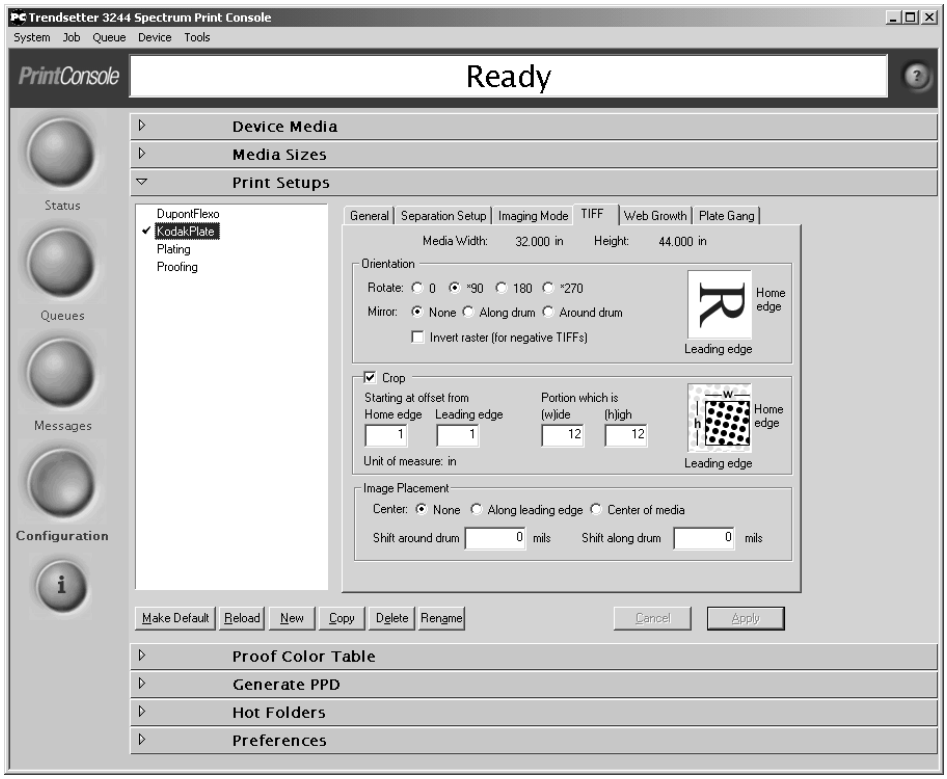


Figure 13.1

TIFF cropping occurs after rotation and mirroring, but before positioning. See "TIFF Downloader Order of Operations" section on page 17 for more information.

14. IMAGE PLACEMENT

The TIFF Downloader now always images the entire medium surface, minus the margins, regardless of the input image size. This is to ensure that no portion of a positive medium is inadvertently left unexposed and therefore capable of transferring ink.

The TIFF Downloader has two options for positioning an image on the plate: **Center** or **Shift**. Both are located on the **TIFF** tab in the **Print Setup** pane.

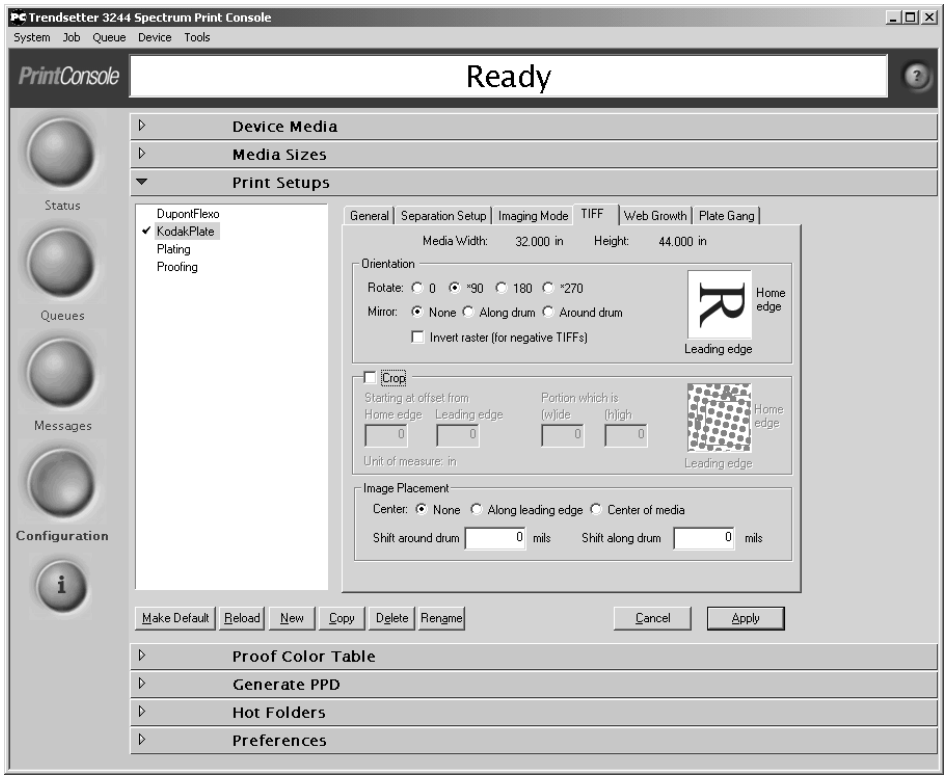


Figure 14.1

If you choose to center the file along the leading edge of the plate, you cannot shift the file in the along-the-drum direction. Likewise, if you center the file on the middle of the media, you cannot shift the file in the along- or around-the-drum directions.

14.1 Shifting

Image shift options, which were previously performed by the device, are now part of the TIFF Downloader functionality (previously the device performed the image shifting). These options shift the image in the along-the-drum direction (subscan), or in the around-the-drum direction (mainscan), which can be useful if, for example, you do not want to reload an autoloader bay or cassette with a different media size in order to have a different image shift.

To shift the image, enter the desired amount in the **Shift along the drum** box and/or the **Shift around the drum** box. If you configure a print setup to center images in the center of the media, both shifting options (mainscan and subscan) are disabled. If you configure a print setup to center the image along the drum, the subscan (along the drum) image shift option is disabled.

14.2 Centering

The TIFF Downloader has two center options located on the **TIFF** tab: **Along Leading Edge** or **Center of Media.**

When you select the **Center** option, the TIFF Downloader centers the image on the media. If the image (after cropping) is smaller than the media, blank data is added to all sides to center the image. If the image (after cropping) is larger than the media, extra cropping is applied to all sides equally so that the center of the image is imaged on the plate.

The **Along Leading Edge** option tells the TIFF Downloader to clip the leading and trailing edges as normal but to also add an equal number of scan lines to the home and away edges when the file is smaller than the imageable area, or crop equally from those edges if the image is larger. This centers the image in the along-the-drum direction and exposes the entire plate.

If you apply rotation or mirroring *and* an image centering option, the image is rotated or mirrored before it is centered. If you apply image centering *and* plate ganging, each file is centered individually within its allotted space on the plate; the TIFF Downloader does not center the group as a whole (see “TIFF Downloader Order of Operations,” page 17).

Figure 14.4 shows the centering options without image shifting, rotation, or mirroring.

Positioning Options

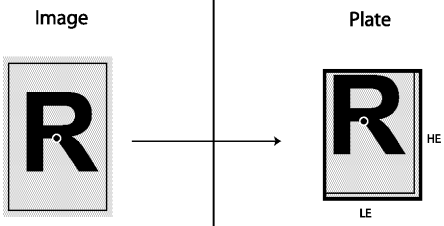
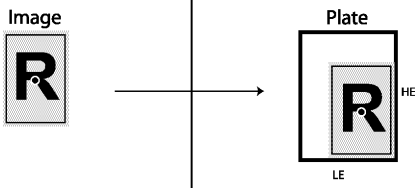
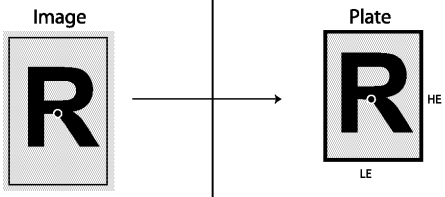
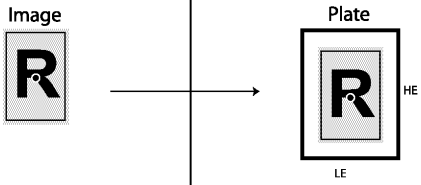
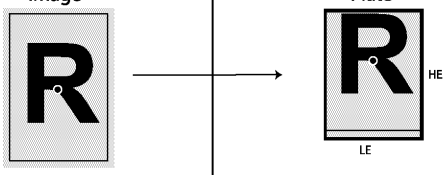
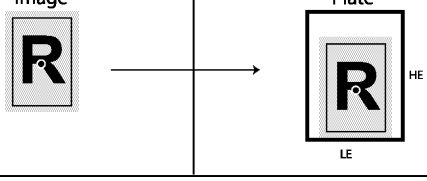
Centering Option	Original Image	Cropped Image on Plate	Description of Crop
No Centering Image > Plate			If no centering options are selected, the TIFF Downloader clips the leading and home edges based on the Device and Material Margin settings in Print Console's Service pane. The trailing and away edges are clipped if the image extends past these borders.
No Centering Image < Plate			If image is smaller than the plate and the Center option is not selected, the TIFF Downloader clips the leading and home edges based on the Device and Material Margin settings. The trailing and away edges are not clipped because the image does not extend into those regions.
Center Image > Plate			If the image is larger than the plate and the Center option is selected, the TIFF Downloader centers the image by clipping the leading, trailing, home, and away edges equally.
Center Image < Plate			If image is smaller than the plate and the Center option is selected, the TIFF Downloader adds blank data to all sides of the image.
Center Along Drum Image > Plate			If image is larger than the plate and the Center Along Drum option is selected, the TIFF Downloader clips equally from both sides.
Center Along Drum Image < Plate ⊙ = center of image			If image is smaller than the plate and the Center Along Drum option is selected, the TIFF Downloader pads the home and away edges equally to center the image, and clips the leading and trailing edges as normal.

Figure 14.4

15. PLATE GANGING

The TIFF Downloader has the ability to image up to four files on a single plate, either in the along the drum direction, or in the around the drum direction. You enable this feature by selecting the **TIFF Plate Gang** option in the **Service** pane and then choosing a ganging orientation on the **Plate Gang** tab.

Once you've selected the ganging direction and gutter width (minimum width between the images), you submit the files and then manually group them in the Pending Queue and approve the job. Note that when you choose the plate ganging options, both the auto-approve option and the web growth options are disabled. The auto-approve option on the **General** tab is disabled because you need to group ganged files together on the plate before approving them. Plate ganging and Web growth are mutually exclusive.

Whether ganging around or along the drum, the TIFF Downloader cannot currently gang TIFFs of different sizes or resolutions (DPI).

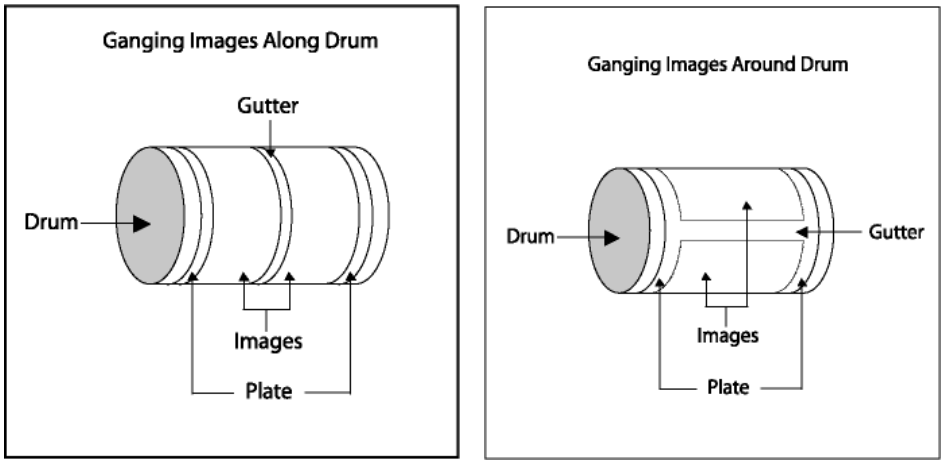


Figure 15.1

15.1 Gang Along Drum

If the images are ganged along the drum, the TIFF Downloader determines the allotted space for each image by subtracting the gutter space from the plate's along-the-drum dimension, then dividing that value by the number of ganged images. It then images the files, one after another in succession, adding extra, zeroed scan lines between them as specified by the gutter setting. Clipping is applied to the over-all plate: leading and trailing edge clippings are applied to all files and home and away edge clippings are applied to the first and last file, respectively.

Figure 15.3 shows TIFF Downloader ganging three images that are smaller than their allotted space on the plate in the along-the-drum direction, without rotation, mirroring, or centering.

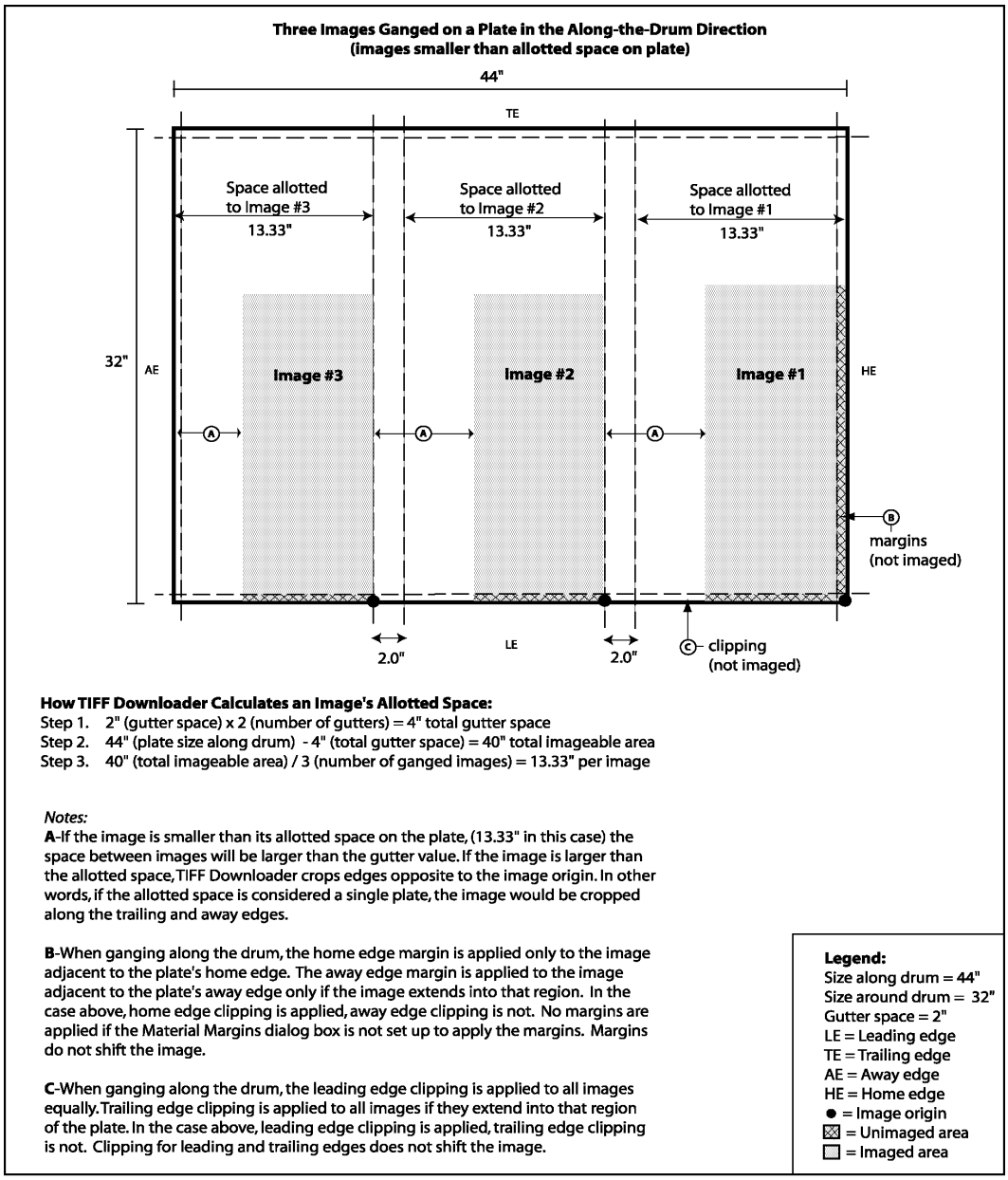


Figure 15.3

If the images are larger than their allotted space, the TIFF Downloader crops the image's away and trailing edges within the allotted space. Note that this means ganged images may be slightly different size on the plate. For example, in the illustration above, Image #1 will be slightly smaller than Images #2 and #3 because image the TIFF Downloader removes the margins on the first image. Indeed, if these images were larger than the plate, image 1 and 3 would be the slightly smaller than Image #2, though TIFF Downloader would remove the first part of image #1 and the last part of image #3. This behavior is slightly different if centering is applied to the images because the centering may move the images away from the leading and home edges.

If enabled, the rotation, mirroring, and centering options are applied to each ganged image individually. The images appear on the plate more or less as though they were imaged on separate plates, and then the plates were glued together side-by-side. For example, if you choose 90-degree rotation and image centering, each image is rotated individually and centered within their allotted spaces on the plate.

15.2 Gang Around Drum

If the images are ganged around the drum, the TIFF Downloader opens each file concurrently since the device has to image a piece of each file on every scan line. To do so, the TIFF Downloader starts an input thread for each file to be ganged, and the files are combined in the clip thread. Clipping is applied to the over-all plate: home and away edge clippings are applied to all files (if applicable), while leading and away edge clippings are applied to the first and last file, respectively (if applicable).

Figure 15.5 shows TIFF Downloader ganging (around the drum) three images that are larger than their allotted space on the plate without rotation, mirroring, or centering.

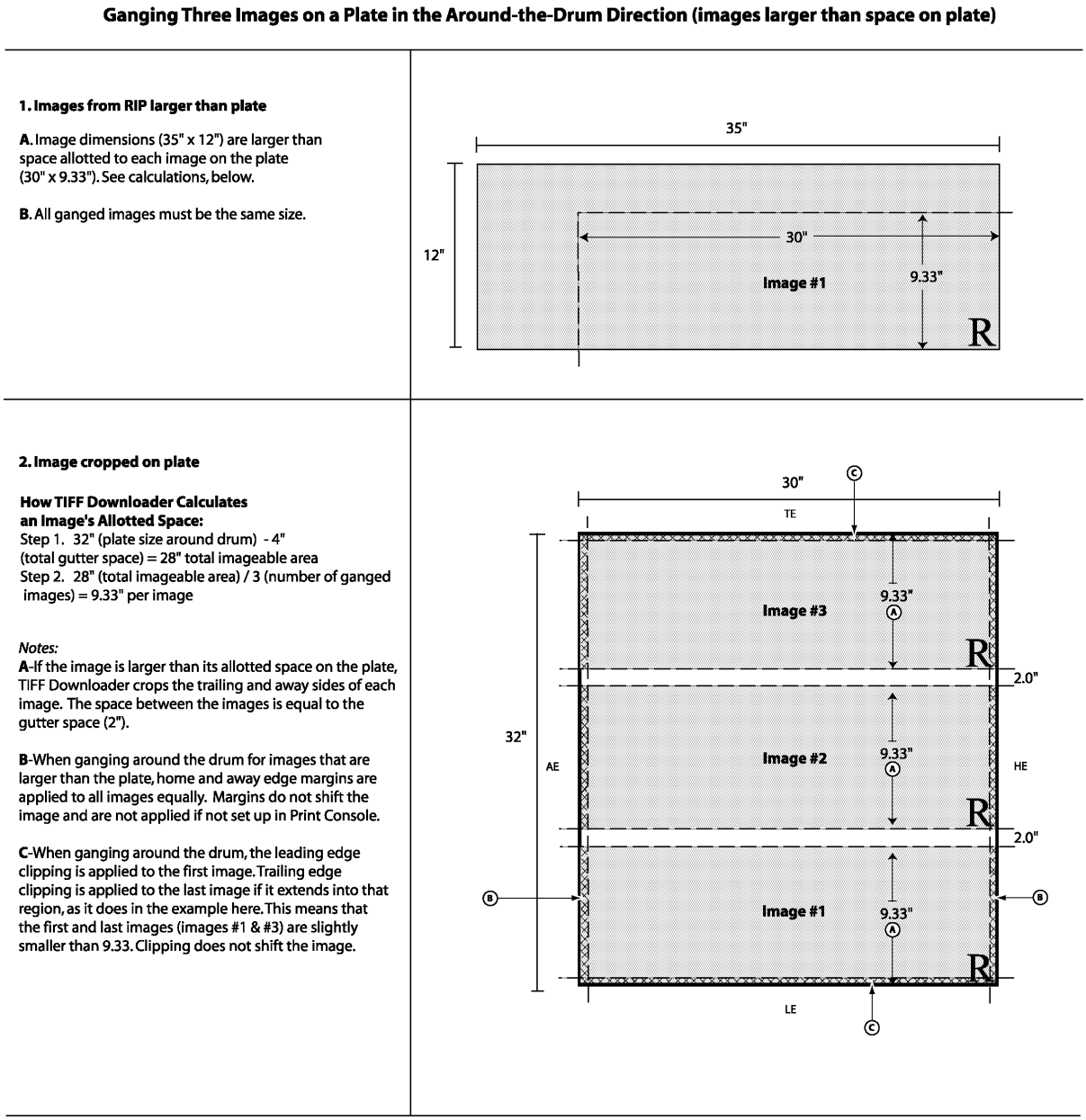


Figure 15.5

When enabled, the rotation, mirroring, and centering options are applied to each ganged image individually (for more information, see the "TIFF Downloader Order of Operations" section on page 17). The images appear on the plate more or as though they were imaged on separate plates, and then the plates were glued together, one on top of the other. For example, if you choose 90-degree rotation and image centering, each image is rotated individually and centered within its allotted space on the plate.

16. WEB GROWTH COMPENSATION

TIFF Downloader can compensate for on-press distortion with the web growth compensation feature available via Print Console's Print Setups pane. Used mainly for web presses, this feature can slightly change the shape of the output raster to match the distortion on each tower in a web press. This feature uses a press profile contained in an XML file that an on-site technical person (not a CreoScitex service person) sets up with the correct distortion values for their particular press. A high-speed algorithm, also used in the Prinergy web growth compensation function, implements a global scaling factor for each axis. The algorithm is contained in the DistortRaster DLL. If web growth is selected for a job, the TIFF Downloader starts a new thread and the image data is passed to this thread after clipping and before tinting. Therefore, the distortion profile maintains its orientation relative to the plate, regardless of mirroring or rotation.

Note: When you select web growth in Print Console, the plate ganging options are disabled since you cannot use both features on the same job.

Print Console installs three files in the **PrintConsole\bin** directory to support this function:

- Web Growth Profile: **SampleProfile.wgp**
- Document Type Definiton: **WebGrowthProfile.dtd**
- Color-to-Press: **ColorTowerMap.txt**

The Web Growth Profile file (**SampleProfile.wgp**) is an XML file that the user must edit with the press distortion values. The file itself can be suffixed with .xml, .wgp, or .dcp extensions, though there is no reason to change the extension. The Document Type Definition file (**WebGrowthProfile.dtd**) provides the legal syntax for the **SampleProfile.wgp** file and should not be modified. The Color-to-Press file (**ColorTowerMap.txt**) is a sample text file that maps color separations to specific towers on the press.

Note: The current maximum amount of distortion the TIFF Downloader can apply to an image is 1.56%, though this should be more than enough for most presses.

The following section shows how to use Print Console to point the TIFF Downloader to the required files.

16.1 Setting Up Web Compensation

Measuring the press distortion is the responsibility of the press, prepress manager, or other on-site technical people. It is not a responsibility of CreoScitex Service Personnel. The following section is provided to describe how the process works:

1. Measure the distortions for particular paper stocks, temperature, humidity, press, and/or whatever other factors affect press distortion at a particular press.
2. Compute the amount of stretch for each direction (x = across web; y = along web), tower, surface, and turn these into percentages.

Note: Note that growth on press can vary, so the growth measured may not be exactly the growth seen on the next run, and consequently the press operators will continue to make small adjustments with bussle wheels/jets. If the press has no bussle wheels/jets in front of the first ink unit and a run experiences less growth than when measured, the web growth compensation will overcompensate and there will be no way to correct on press. Consequently, if there are no bussle wheels/jets in front of the first ink unit they may want to use somewhat lower numbers (~3/4 of the measured growth) and use bussle wheels/jets to compensate for the rest mechanically.

3. Using a text editor, open the **SampleProfile.wgp** file located in the **PrintConsole\bin** folder.

4. Add the stretch percentages to the sample profile: add the across the web distortion percentage to the "xpercent=" parameter. add the along the web distortion percentage to the "ypercent=" parameter:

```
<plate tower="1" side="U">
      expansion xpercent="1.0" ypercent="0.30"/>
```

Note: The "side = "U"" parameter in this file indicates that these values represent the distortion on the upper side of the web. Since distortion on the lower side of the web is usually the same as that on the upper side of the web, there is no need to add separate values for the lower side. In rare cases where the distortion on thse upper side of the web is different from that on the lower side of the web, add the lower cylinder distortion values for each tower to the same file using the side="L" parameter:

```
<plate tower="1" side="L">
      expansion xpercent=".05" ypercent="0.60"/>
```

5. Save the profile file with a unique file name—for example, **Press_1_Distortion.wgp**. Do not copy over the original sample profile file.

6. Using a text editor, open the sample tower-color file (**ColorTowerMap.txt**) in the **PrintConsole\bin** directory.

7. Type the names of the color separations in the job files next to the number of the color tower running each color, for example, Yellow 1. See section 16.2 for an example of the file.

8. Save the tower-to-color file with a unique name—for example, **Press_1_ColorTowerMap.txt**.

9. In Print Console, create a new print setup and enable web growth:

   - On the **Web Growth** tab, select the **Apply Web Growth** check box.

   - In the **Web Growth** box, enter the path and file name of the web growth profile file (for example, **Press_1_Distortion.wgp**). If necessary, click the **Browse** button to locate the file.

- In the **Color-to-Press Tower** box, navigate to the color-to-tower file (for example, **Press_1_ColorTowerMap.txt**).

- Select the **Upper** unit position. The **Upper** and **Lower** settings refer the TIFF Downloader to the **"U"** or **"L"** values in the distortion profile file.

Note: Enable the **Lower** radio button only in rare cases where the upper and lower sides of the web on a particular tower have different distortions. In such a case, you would need to add "L" values to the distortion profile file in step 4.

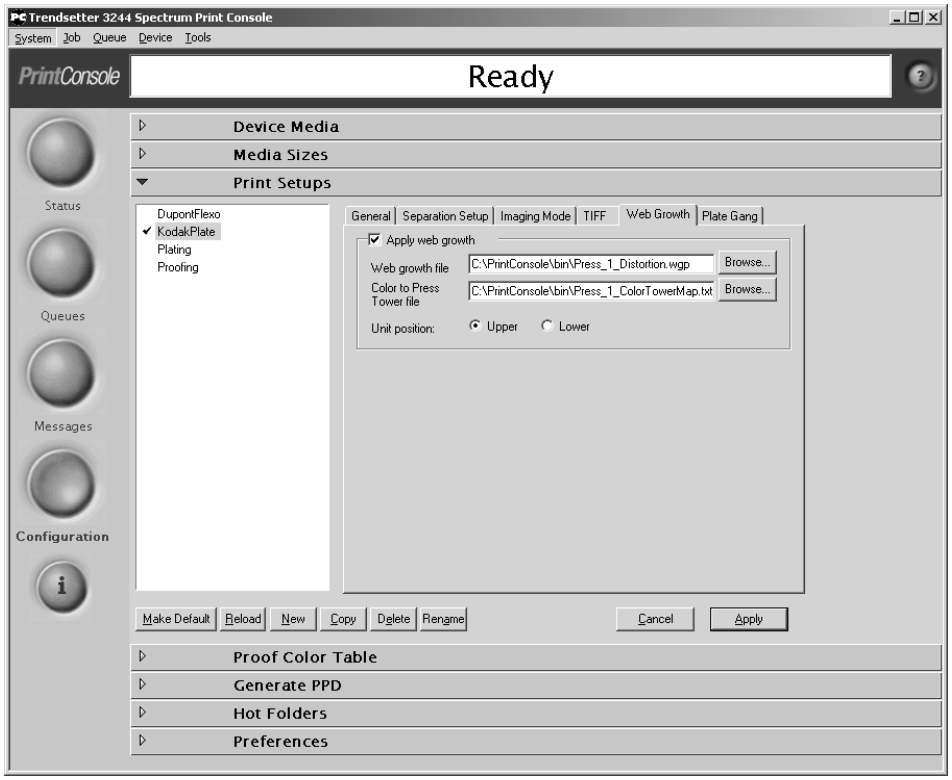


Figure 16.2

10. Use this print setup to submit jobs to the device.

16.2 Color-to-Press Tower File

The following shows an example of the content of the **ColorTowerMap.txt** file:

```
#####Sample tower-color file.
#####For use with the Web Growth feature
####Make entries of the form:
####ColorName TowerNumber
####Make 1 entry per line
Yellow 1
Cyan 2
Magenta 3
Black 4
Pantone 12 CVC 5
Spotty Spot 6
```

16.3 Web Growth Profile File

This section shows the content of a sample **SampleProfile.wgp** profile file:

```
<?xml version="1.0 encoding="UTF-8"?>
<!DOCTYPE profile SYSTEM "WebGrowthProfile.dtd">
<profile>
<plate tower="1" side="U">
      expansion xpercent="1.0" ypercent="0.30"/>
</plate>
<plate tower="2" side="U">
expansion xpercent="0.8" ypercent="0.25"/>
</plate>
<plate tower="3" side="U">
expansion xpercent="0.6" ypercent="0.20"/>
</plate>
<plate tower="4" side="U">
expansion xpercent="0.3" ypercent="0.15"/>
</plate>
</profile>
```

Note: If the lower cylinder (bottom side of the web/sheet) has a different distortion value than the upper cylinder (top side of the web/sheet), you can add a second a second set of values using the side="L" attribute instead of the side="U" attribute. If the lower cylinder values are different, which is quite rare, you would need to set up two different print setups in Print Console: the one for the upper cylinder would have the **Upper** radio box selected; the one for the lower cylinder would have the **Lower** radio box selected.

17. DEVICE CLIPPING/DEVICE MARGINS

TIFF Downloader supports the use of margins on all 4 sides of the media via the Print Console software, though this option is not available to regular users/operators. These clipping settings can be entered for each device media via the Device Margins section of the **Service** pane's **Configure System** option.

These margins define areas of the media that cannot be imaged. The output device will not allow imaging in these areas, and therefore TIFF Downloader removes these areas from the image file before it is output. In other words, the RIP, upstream, has no idea about the device details it is sending the file to; it only knows the media size and therefore makes the TIFF file this size. TIFF Downloader, on the other hand, knows the specific details about the device, such as clamps settings and media margins, which could be different depending on the device. Consequently, it clips the file as necessary to fit the device. For example…

- The TIFF could be sent to TIFF Downloader for plate media and have the leading and trailing edge clamp raster removed (to avoid our leading-edge clamps)
- The TIFF could be sent to TIFF Downloader onto a media with margins assigned (to always avoid imaging within, say, 1/2" of the edge of the media to avoid fingerprints etc.)

In other words, you have a device- and media-generic TIFF.

The exact handling of the margins depends on the sizes of the image and the media. TIFF Downloader always removes the leading and home edge margins from the image. The trailing and away edge margins are removed from the image only if the image extends into these regions on the plate.

For example, assume the following margins are set:

Leading edge: 300 mils
Trailing edge: 200 mils
Home edge: 100mils
Away edge: 100 mils

If the 32" by 44" version of a file is to be imaged on a 32" by 44" plate, all margins would be applied and the TIFF Downloader would output an image that is 31.5" by 43.8". If this same file were to be imaged on a 22" by 33" plate, the TIFF Downloader would produce a 21.5" by 32.8" image. Imaging this file on a 40" by 50" plate, though, would produce a 31.7" by 43.9" image.

Note that there is a minor limitation in the way the TIFF Downloader handles the leading edge clip when the rotation is set to 90 or 270 degrees. The leading edge clip is converted to pixels and rounded down to the nearest multiple of 8. This will result in an image shift on plate of up to 7 pixels, which at 2400 dpi is about 0.003" (3 thousands of an inch). For example, if a leading edge clip of 115mils is specified for a 2400 dpi image, the actual leading edge clip will be 113.3 mils (corresponding to 272 pixels instead of 276).

The position of the first pixel imaged on plate will not move since the recorder controls it. Rather, the image position relative to the edge of the plate will move. The image position on the plate will be shifted by the rounded off amount, but the overall image size will not be

adjusted (i.e. the trailing edge clip is automatically increased by the rounded off amount). For example, if 9 plates are made and the leading edge clipping is incremented by 1 on each successive plate, the image position of the first 8 plates will be different by 1 pixel, and the image position of the first and ninth plates will match.

The same type of rounding occurs with the home edge clip for rotations of 0 and 180 degrees.

18. OFFLINE TIFF FILE PROCESSING

18.1 Sending TIFF Downloader Output to File

Output from the TIFF Downloader can be redirected from the device to a TIFF file for debugging. This can be useful when trying to determine whether the TIFF Downloader or the device is causing an imaging problem. The TIFF Downloader can also be used to resize or reorient a TIFF file.

To redirect all TIFF Downloader output from the device to a TIFF file, use the **/tiff** command line option. Each TIFF file submitted via Print Console will be output to a TIFF file in the current directory (usually **PrintConsole\bin**) with the same name as the input file, but suffixed with **.out.tif**. If using a device simulator, the image will normally complete successfully. However, if a real device is connected, the image will normally have to be cancelled manually once the processing is 100% complete.

Note that the default compression for the output TIFF is G4. This can be changed with the following command line options:

/outnc – no compression

/outlzw – use LZW compression

/outzip – use zip (also known as flate) compression

18.2 Running TIFF Downloader Without Print Console

This version of TIFF Downloader can be run without Print Console. This standalone mode is initiated with either the **/file=***filename* or the **/setup=***setupfilename* command line parameters. If either command is used, the TIFF Downloader will not attempt to connect with Print Console. It will instead process the specified file(s) and then terminate. These commands are best used when sending output to a TIFF with the **/tiff** command (see section 1.1).

The **/setup=***filename* command requires a setup file that has been created by the TIFF Downloader. This file is created by running the TIFF Downloader with the **/setup** command, which creates the **TDLSetup.txt** in the current directory (usually **PrintConsole\bin**). This file contains a default setup and can be edited with a text editor. Text that appears to the left of the equal sign should not be modified, since the TIFF Downloader must find an exact match with the text there. The parameters correspond to parameters found in the Print Console's **Print Setup** pane and **Service** pane and should be self-explanatory.

For example, to send the file "D:\TestFiles\Sample2400.Tif" to an output TIFF with default parameters, run the TIFF Downloader with the following command line:

TiffDownloader /setup

Open the resulting **TDLSetup.txt** file with a text editor, and modify the **"SingleFileName (Used when PlateGang = 0) …"** line to look like the following:

SingleFileName (Used when PlateGang = 0) = D:\TestFiles\Sample2400.Tif

Run the TIFF Downloader again with the following command line:

TiffDownloader /setup=TDLSetup.txt /tiff

You can also use the **/file=***filename* command to specify the filename to image. If no setup file is specified, the file is imaged with default parameters (these are the same parameters found in a newly created **TDLSetup.txt** file). If a setup file is specified, all parameters are taken from it except the filename, which is taken from the **/file=** command.

19. LOG FILES

The TIFF Downloader writes useful information about TIFF jobs into the debug log located in the Print Console log directory (usually **PrintConsole\log**, determined by the registry entry **Software\Creo\LogManager\LogFilePath**). Information on a submitted file is found just after the "Starting Input thread" message. Statistics on the job, such as processing times and output data rate, are found just after the "Ending Input thread" message. If the TIFF Downloader experienced an error while processing the file, extra information is sometimes contained in the log.

A list of statistics is written to the log file at the end of every image. These statistics can also be written to a file using the **/statsfile** command line option. An explanation of each statistic follows in the order that they appear in the log file (see figure 5.1 for the measurement points for these stats):

- Temp file write time:

  If a temporary file was written in order to rotate a non-tiled file by 0 or 180 degrees, the total time required to read and decompress input file and then compress and write temporary file. One per input thread.

- Read and Decompress time while writing temp file:

  If a temporary file was required, this is the total time spent reading and decompressing the input file. The time to compress and write the temp file can be calculated by subtracting this time from the Temp file write time (described above). One per input thread.

- Auxthread *N* read time:

  Total time that auxiliary thread *N* spent reading and decompressing.

- Auxthread *N* decompress time:

  Time that auxiliary thread *N* spent decompressing only.

- Total time clip thread waited for input thread(s):

Time that the clip thread spent waiting for an input buffer. If the clip thread has to wait for the input thread, it means that the input thread could not keep up with the rest of the file processing. If this time is relatively close to the overall image processing time, the file read and decompression is likely the bottleneck.

- Total time clip thread waited for write thread:

  Time that the clip thread spent waiting for an output buffer. If the clip thread has to wait for an output buffer, it means that subsequent thread(s) (i.e. write thread and possibly the web growth and tint threads) cannot keep up with input and clip threads. If this time is relatively close to the overall image processing time, the SCSI write (or web growth or tint) is likely the bottleneck.

- Total time clipping/rotating:

  Time spent in the clip thread clipping, rotating, and mirroring. Usually this time is small compared to the time spent in the Input and Write threads.

- Total time for web growth:

  Time spent in the web growth DLL.

- Total time for tinting:

  Time spent in tinting library.

- Total time spent writing:

  Total time spent writing the image data to the SCSI port. Note that this time will always be longer than the true time spent transferring data because the transfer of SCSI data is started before actual imaging starts. The write thread therefore spends some time waiting for device to begin imaging once SCSI transfers have begun, and this wait time is included in the reported time. The wait time is usually around 1 or 2 seconds.

- Average output data rate (MB/sec):

  A calculated value based on the total number of bytes output divided by the Total time spent writing (above). Note that this average data rate will always be smaller than the true average data rate, for reasons described above.

Note that on multiprocessor systems, the above times will not add up to the total image time because threads are running at the same time.

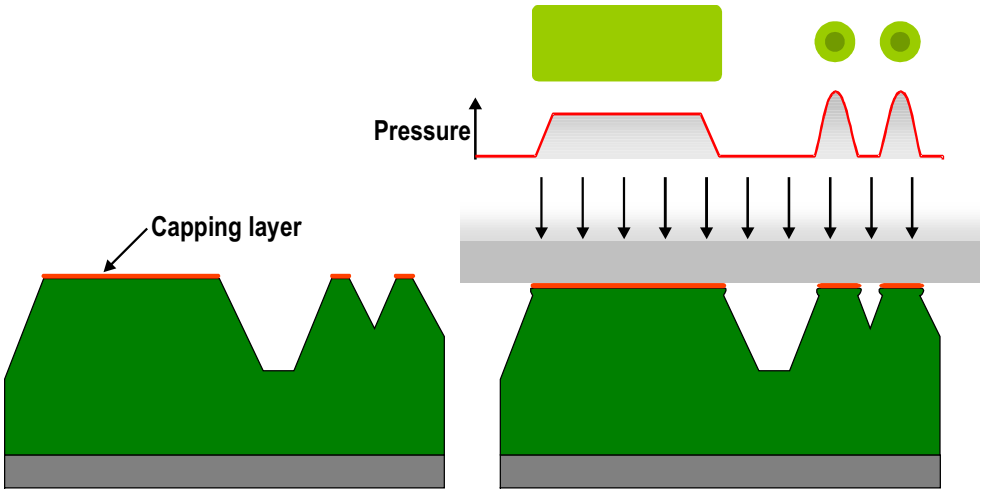
20. DIGITAL MASKING (AKA "TINTING")

TIFF Downloader supports ThermoFlex digital masking mode (also known as "tinting"), which applies a digital mask to thermal film. Digital masking has been developed for the packaging industry, more specifically for the liquid photopolymer flexography industry. In the liquid flexo business, tonal ranges in the 1%–4% and 97% to 100% are almost impossible to achieve at the same time. The limiting factor is that the liquid is hardened by exposure to UV light; if a flexo plate is exposed long enough to develop the tones in the 1%–4% range so they will last and print on press, then the 97%–100% tones will overexpose and all become 100% (and vice versa). Digital masking provides a process by which the amount of light reaching the liquid can be controlled, thereby providing the wider overall tonal range needed.

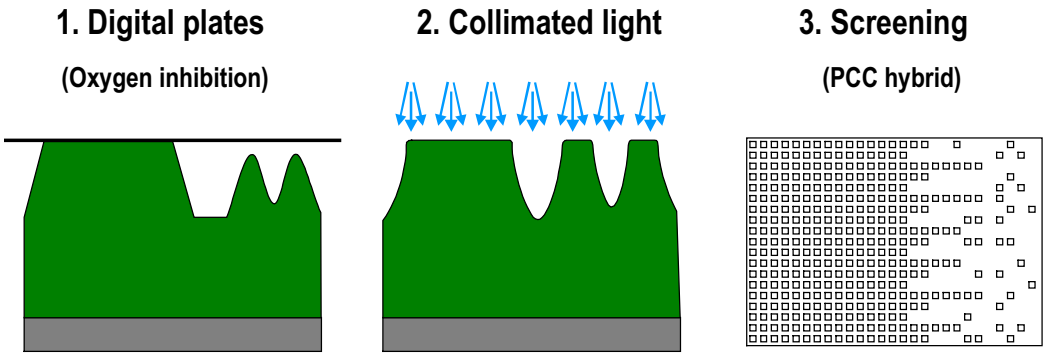
Liquid photopolymer is exposed with UV light until it hardens. The UV light is transmitted through a film (Kodak DITF–a.k.a. Volcano film–in the case of ThermoFlex) allowing an image to be imposed on the hardening liquid. By setting the exposure of our thermal imaging heads to only half expose the film in one pass, and thus fully expose the film in two passes we can make the otherwise binary film into a piece of trinary film. If we half expose the film in the 97%–100% range, and then fully expose it in the 1%–4% range, we can in effect regulate how much light is allowed to reach the liquid photopolymer.

We can go one step further and vary the amount of exposure based on the target tonal percentage and get a nice, smooth curve customized for maximal tonal range on the finished plate. Creo has done this, and the functionality resides in the CreoScitex TIFF Downloader. The final result coming out of the TIFF Downloader is 2 full images –the original TIFF file and the masking image–interlaced together scan line by scan line. We image the entire original TIFF file at half exposure, then the masking image fully exposes the areas required for proper exposure levels.

Dot gain is the biggest challenge for flexography.



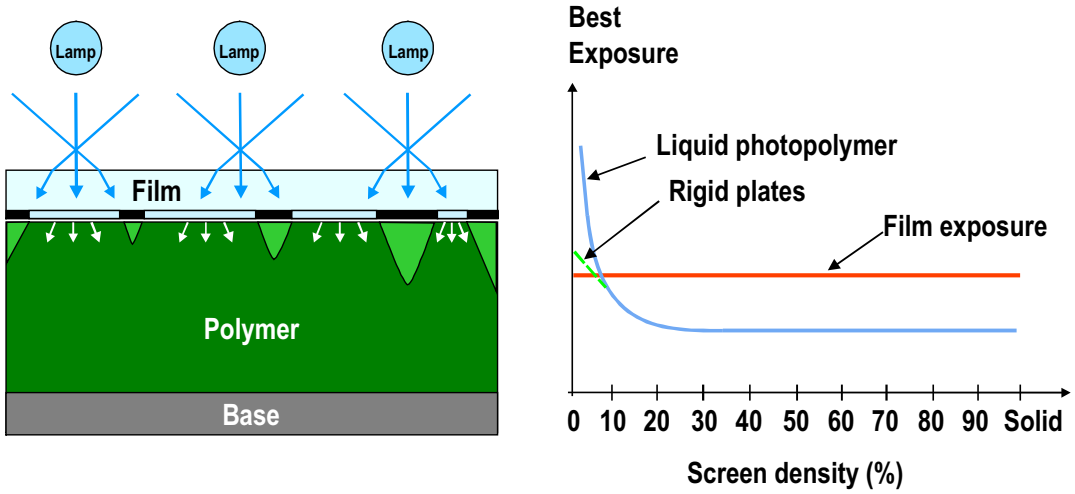
A number of solutions have been tried to reduce or control dot-gain. Some of these are oxygen inhibition, collimated exposure and hybrid screening.



Another solution is to remove one of the major causes of dot gain in flexography: overexposure of mid-tones and shadows. Flexo plates require varying exposure to provide "highlight" screens with more UV than mid-tones/shadows. This means that you have to make a compromise; if you decide to expose long enough to hold a good 2% dot, you will be overexposing everything else. Looking at the graph, you can see that the problem is much greater in liquid photopolymer than in sheet photopolymer.

Flexo Plates: Varying Exposure

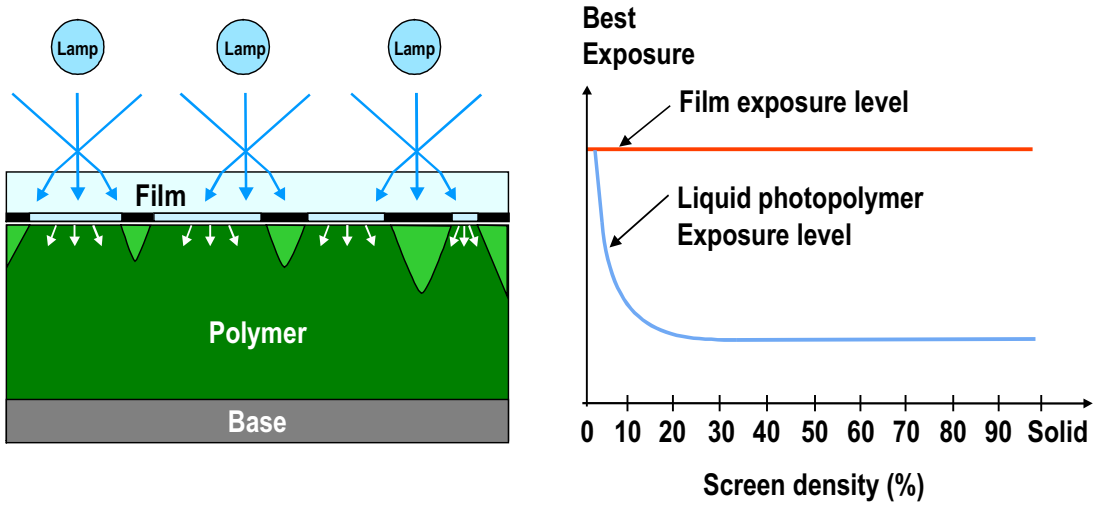
- Highlight screens need more UV than mid-tone/shadows
- Creates compromise
- Even greater problem for liquid photopolymer



The tinted film process (digital masking) is a way to avoid this problem. Digital masking allows you to choose the UV exposure for each screen, matching the exposure of each screen to the best exposure for that screen. This means that you can hold even a 0.4% 120 lpi dot on the plate without drastically over-exposing every other screen.

Digital Masking Process

- Avoids problem of exposure compromise
- Allows choice of exposure for each screen

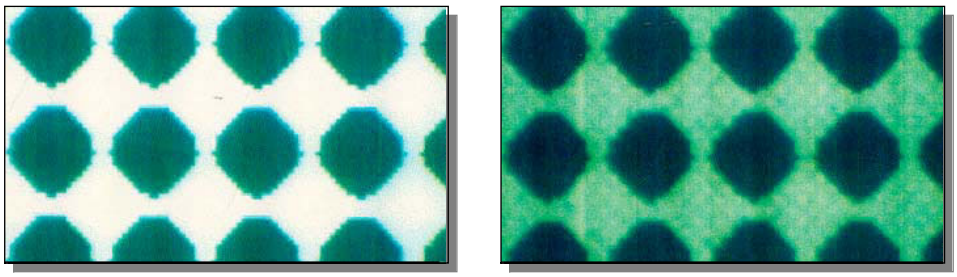


The film used is Kodak DITF (a.k.a. Volcano). It is a processless, ablative film. Un-imaged film has a UV density of 4, and imaged film has a UV density of < 0.1. Volcano film can also be partially exposed, allowing you to set the UV density anywhere between unexposed and imaged film. When using digital masking, you have three levels of UV transmission in the film: un-imaged (UV density of ~ 4.0), tinted (UV density of ~ 1.0) and imaged (UV density of ~0.1).

The figure below shows a micrograph of normally imaged Volcano Film next to digitally masked Volcano.

Digital Masking Process

Unmasked vs Masked Thermal Film



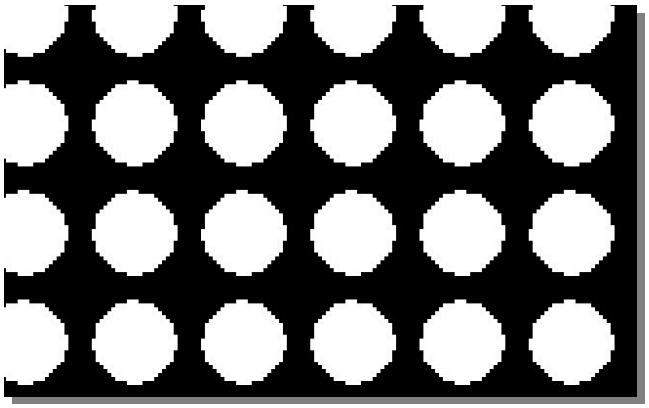
Unmasked Digitally Masked

The next four slides are examples of how you can control the effective exposure of a screen through digital masking. These are slides show various levels of transmission on a 45% Euclidean screen at 120 lpi.

The slide below shows a normally imaged Volcano film. Effectively all of the light goes through.

Unmasked Film - 92% Transmission

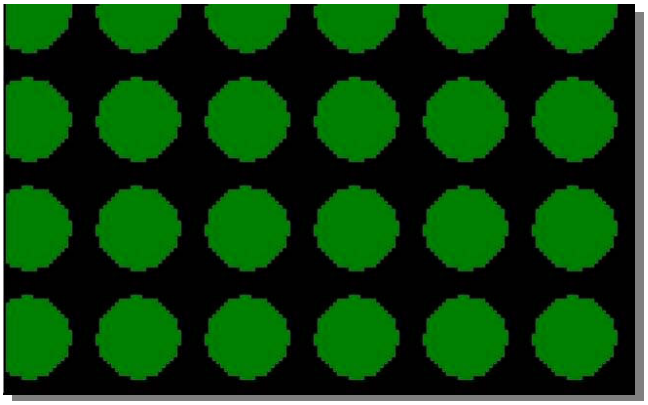
- All light goes through



The slide below shows a fully masked screen. This has a transmission of only 1/12 of the normal film, so after 1200 seconds on the light table, the film has an effective exposure time of 100 seconds.

Full Digital Mask on film - 8% Transmission

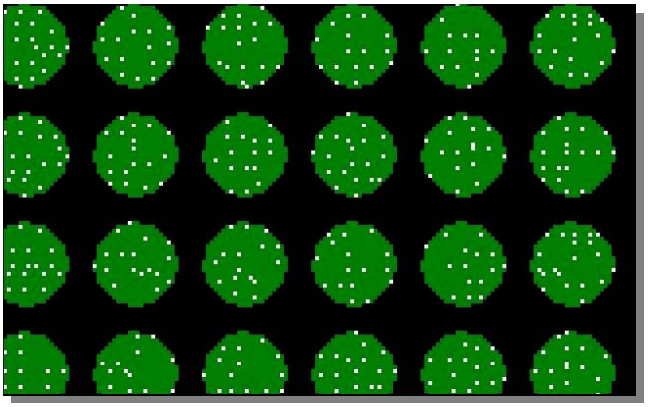
- Controlling the exposure by "masking" the film



The slide below shows a partially cleared film. The clear dots you see are single 2400 dpi pixels, which can be easily imaged using Creo's SQUAREspot™ technology. The transmission of this film is 1/8 of the normal film, so after 1200 seconds on the light table, the film has an effective exposure time of 150 seconds.

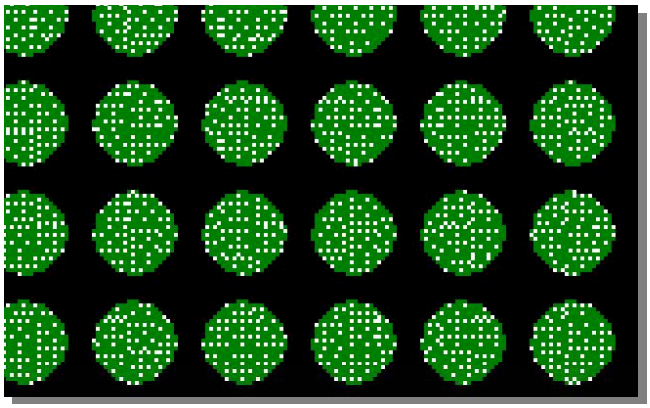
The transmission is determined by the ratio of clear to tinted pixels within the cell. The CreoScitex TIFF Downloader calculates the ratio of clear to tinted pixels based on the required transmission for that screen, and then randomly places the clear pixels within each cell. A curve of Transmission vs. Screen is defined within the TIFF Downloader, so you can match the exposure vs. screen curve to the best exposure for each screen.

Partial Digital Mask on film- 12.5% Transmission

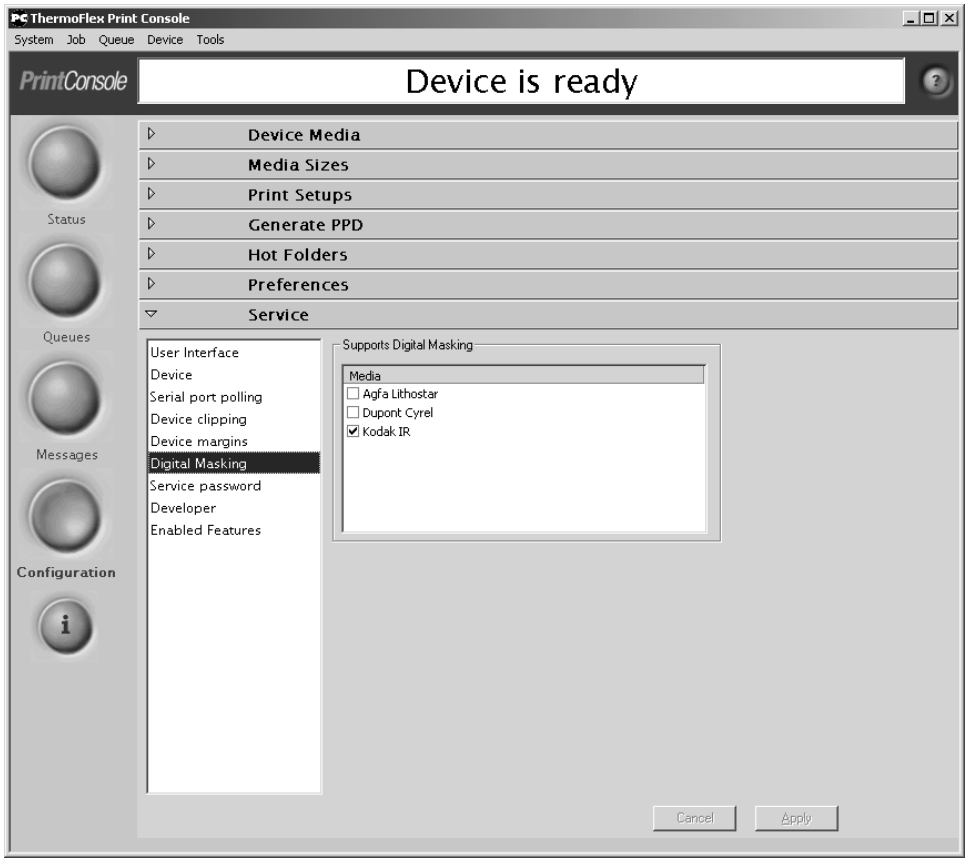


The figure below shows another partially cleared film, this time with a few more cleared pixels. This film lets through 1/4 of the light, so after 1200 seconds, you will get an effective exposure of 300 seconds.

Partial Digital Mask on film - 25% Transmission



The tinting feature is selected for a device media by first enabling tinting for the media via the Configure System dialog box's Digital Masking tab (accessed via the Service pane):



...and then selecting the desired Digital Masking scheme for the media via the Device Media dialog box's Digital Masking scheme drop-down list:

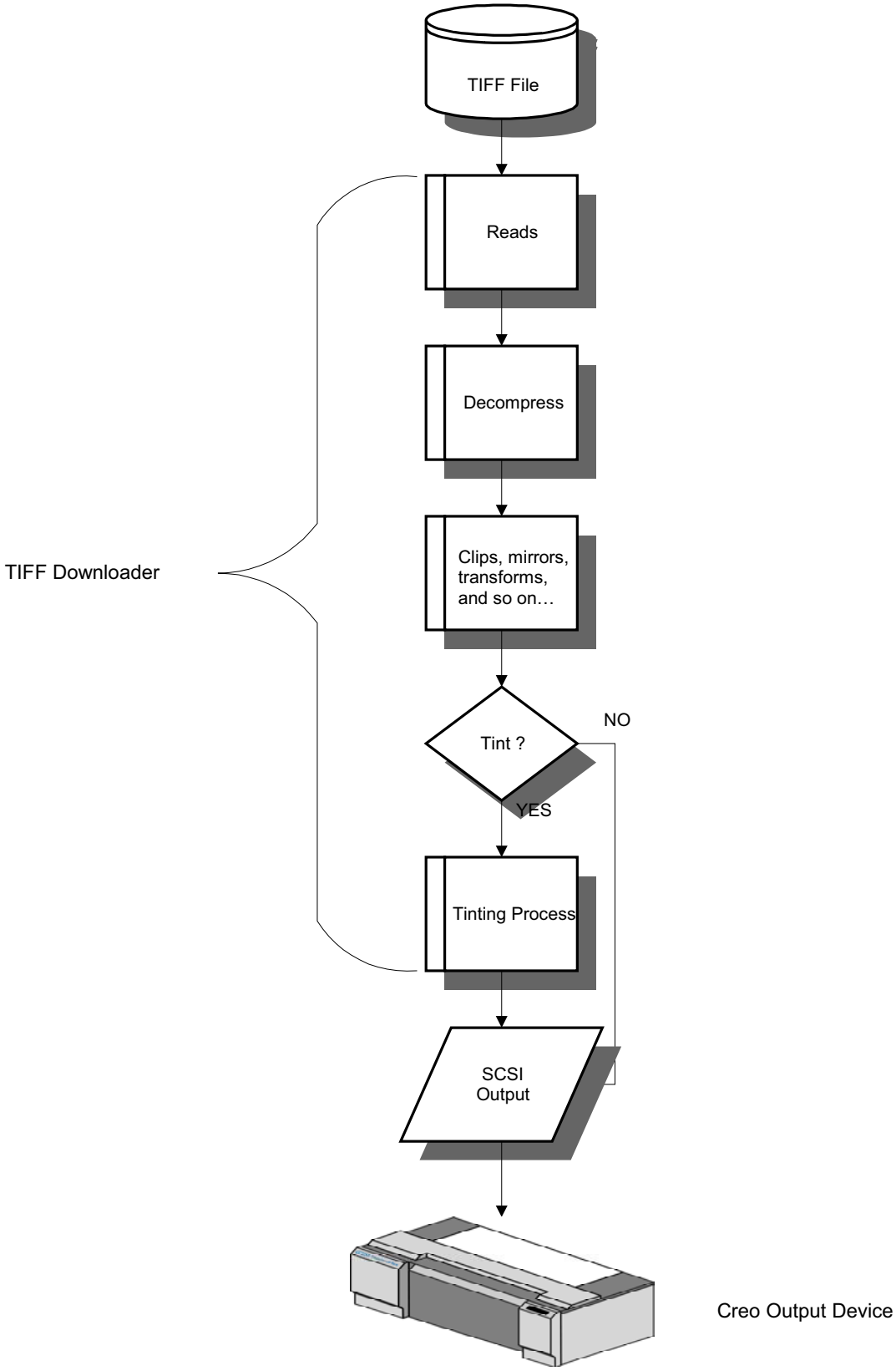


Note that Digital Masking schemes are entered directly in the registry, under **TintingSchemes** in the **PrintConsole\Vx.x** key.

The TIFF Downloader's interaction with the tinting algorithm is very simple. It reads, decompresses, clips, and optionally transforms the data in the usual way. (For Print Console 2.0.*x*, the image data is also optionally mirrored at this point.) If tinting is not enabled, the data is then sent directly to the SCSI port and on to the output device. If tinting is enabled, the data is sent to the tinting module. The tinting module does its processing, which results in two scan lines produced for every one original scan line. (For Print Console v1.1 and higher, the data is optionally mirrored at this point.) The tinted data is passed back to the TIFF Downloader, which then sends it to the SCSI port.

The data is read in and processed in blocks (this is the buffer size). The TIFF Downloader is also divided into threads: Read/Decompress/Clip/Mirror is done in one thread, tinting in another, and SCSI output in a third.

Tinting with TIFF Downloader



21. APPENDIX A – TIFF FILE SPECIFICATION

TIFF File Parameter	Values Supported
Byte Ordering	Little Endian or Big Endian (i.e. Intel/PC or Motorola/Mac)
Data Organization	Tiles, Strips, Single Strip
File Size	4GB file size limit (but image size can exceed 4GB if compressed). TIFF spec limitation.
BitsPerSample (tag 258)	One (also known as bi-level or monochrome TIFF)
SamplesPerPixel (tag 277)	One
Compression (tag 259)	1 – No compression 2 – Modified Huffman 3 – G3 4 – G4 5 – LZW 32773 – Packbits 32946 – Deflate (otherwise known as Zip or Zlib)
ImageWidth (tag 256)	Arbitrary, does *not* need to be a multiple of 8, 16, 32, etc.
ImageLength (tag 257)	Arbitrary, does *not* need to be a multiple of 8, 16, 32, etc.
XResolution (tag 282)	Arbitrary
YResolution (tag 283)	Arbitrary
ResolutionUnits (tag 296)	3 – Centimetre All other values – Inch
PhotometricInterpretation (tag 262)	MinIsWhite (normal), MinIsBlack (inverted)
Orientation (tag 274)	Only type one is supported (0th row is top, 0th column is left). Other Orientation values are ignored.
FillOrder (tag 266)	1 – most significant bits filled first (recommended) 2 – least significant bits filled first
PlanarConfiguration (tag 284)	Ignored (assumed to be one)
ImageDescription (tag 270)	Passed to Print Console as SeparationName and displayed in log file
DocumentName (tag 269)	Displayed in log file only
Make (tag 271)	Displayed in log file only
Model (tag272)	Displayed in log file only
Software (tag 305)	Displayed in log file only
DateTime(tag 306)	Displayed in log file only
HostComputer (tag 316)	Displayed in log file only
Copyright (tag 33432)	Displayed in log file only