Kodak Graphic Communications Canada Company
3700 Gilmore Way
Burnaby, B.C., Canada
V5G 4M1
Tel: 1.604.451.2700
Fax: 1.604.437.9891

Request support: http://graphics.kodak.com
ecentral.creo.com

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Technical Bulletin

Variable Mainscan Resolution Option

The Variable Mainscan Resolution (VMR) option adjusts the pixel resolution of a Kodak® output device in the mainscan (around-drum) direction to align the pixel boundaries with the frequency of the lenticular lens boundaries. The combination of accurate registration capabilities, Kodak SQUAREspot® thermal imaging, and the VMR option enables lenticular printers to produce high-quality output.

There are two supported workflows for imaging VMR jobs on Kodak output devices. The first is a 1-bit TIFF workflow via the Kodak TIFF Downloader software, and the second is a direct workflow via workflow software such as Kodak Prinergy®, Kodak Prinergy® Evo™, or Kodak Brisque®.

When to Use the VMR Option

In lenticular printing, the pixels per inch (ppi) of the interlaced image file may not be a direct division of the fixed resolution (2400 dpi or 2540 dpi) of the thermal imaging head. If you image an interlaced image file at a fixed resolution, the print job may contain aliasing artifacts. This is because the interlaced strips of the image do not match the boundaries of the lens.

Use the VMR option to ensure that the pixel frequency of an image is an exact multiple of the lens frequency. You can:

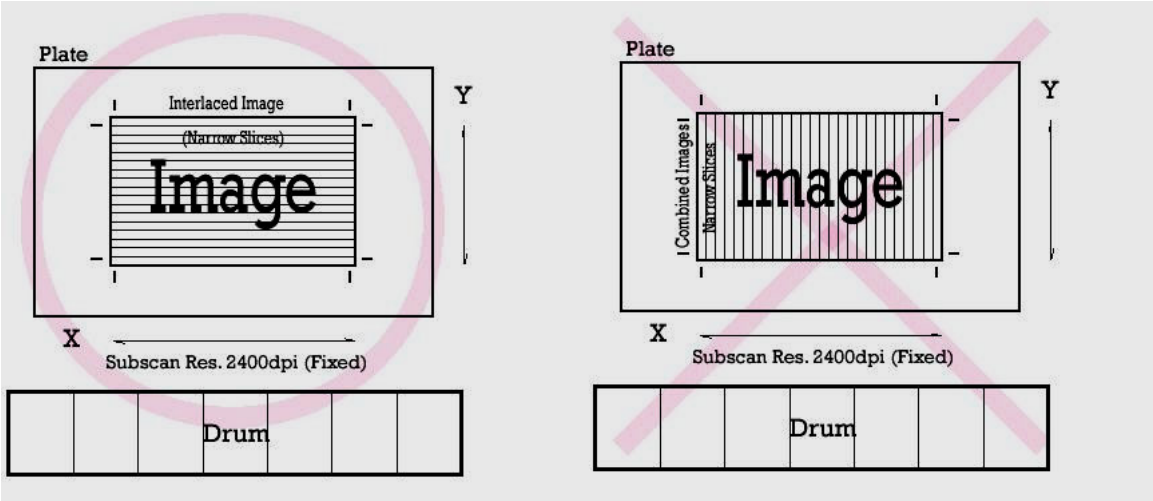
- image files rendered at an integer mainscan (around-drum) resolution of up to 4800 or 5080 dpi (9600 or 10160 dpi for VMR96), depending on the thermal imaging head resolution
- For finer adjustments, enter a target mainscan resolution, using up to three decimal places. To further adjust the image to exactly match the lens frequency, stretch or shrink the pixel size. The limit of this fine adjustment is ± 3.2% of the image mainscan resolution.

Note: In all instances, the subscan (along-drum) resolution remains at 2400 or 2540 dpi.

Limitations of the VMR Option

- Depending on the image resolution, the imaging speed on jobs that use the VMR option might be reduced to the standard imaging speed of the output device, regardless of the speed option.
- For Kodak Staccato® FM screening, VMR is limited to 2400 dpi ± 3.2% because Staccato does not support asymmetric resolution.
- For Kodak Trendsetter Spectrum® halftone proofing, VMR is limited to 2400 dpi ± 3.2% due to media limitations.

- The interlaced image strips (or lenticular lens) must run across the drum, because the resolution can only be varied in one direction.



Using a 1-Bit TIFF Workflow With the VMR Option

Output Using Print Console TIFF Downloader

Note: Use this method if your device-control software is Print Console 2.x or 3.x.

1. In Print Console, create a plate size (if required) and a Print Setup that uses that plate size.
2. On the **Variable Mainscan Resolution** tab in Print Setup**,** select the **Enable Variable Mainscan Resolution** check box and clear the **Auto approve** check box.
3. Click **Make Default** to make this Print Setup the default print setup.
4. Submit the 1-bit TIFF file to Print Console.

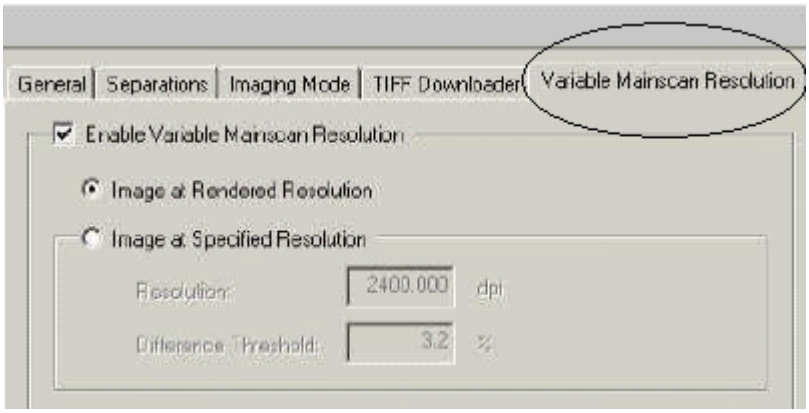
   Make sure the file output orientation is correct. The interlaced lines should be running along the drum and the subscan (along-drum) resolution must be 2400 dpi. If the output orientation is not correct, change the rotation settings in TIFF Downloader.

5. On the **Variable Mainscan Resolution** tab, perform one of the following actions to apply VMR:
   - If the TIFF file is already screened at a specific VMR resolution that matches the lens pitch frequency (for example, 4800 dpi in mainscan × 2400 dpi in subscan), select **Image at Rendered Resolution**.

     Note: This option only supports integer resolutions. For decimal resolutions, select **Image at Specified Resolution** and specify the resolution.

   - If the mainscan resolution of the file must be further adjusted, select **Image at Specified Resolution** and specify the desired mainscan resolution, using up to three decimal places.

     Note: The maximum resolution that you can specify is ± 3.2% of the image's mainscan resolution.



6. Approve the file in Print Console and image the plate.

Output Using Prinergy Evo TIFF Downloader

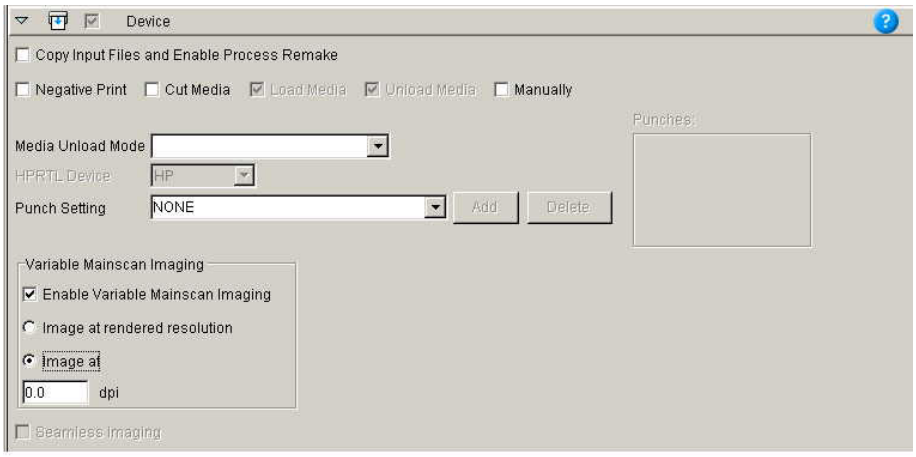
Note: Use this method if your device-control software is Print Console version 4.x or Kodak Xpo™ 3.x.

1. In the Process Template Editor, configure an output from TIFF file template.
2. Select the desired plate size and image orientation in the **Layout** tab.
3. On the **Device** tab, select **Enable Variable Mainscan Imaging**.
4. Perform one of the following actions to apply VMR:
   - If the TIFF file is already RIPed at a specific VMR resolution that matches the lens pitch frequency (for example, 4800 dpi in mainscan × 2400 dpi in subscan), select **Image at rendered resolution**.

     Note: This option only supports integer resolutions. For decimal resolutions, select **Image at** and specify the resolution.

   - If the mainscan resolution of the file must be further adjusted, select **Image at** and specify the desired mainscan resolution, using up to three decimal places (for example, 2432.123 dpi).

     Note: The maximum resolution that you can specify is ± 3.2% of the image's mainscan resolution.



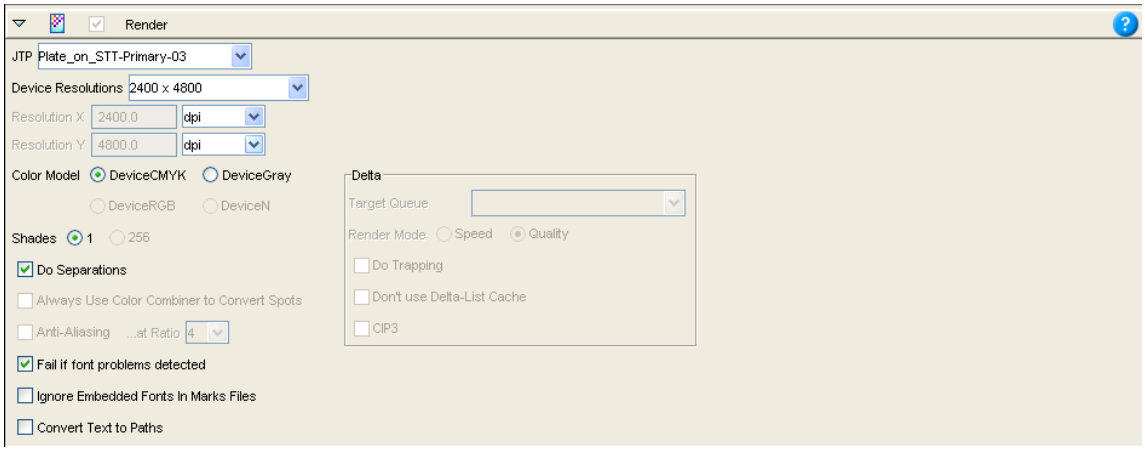
5. Save the process template and then submit a 1-bit TIFF file to the template to output a job.

Using a Direct Workflow With the VMR Option

Output Using Prinergy

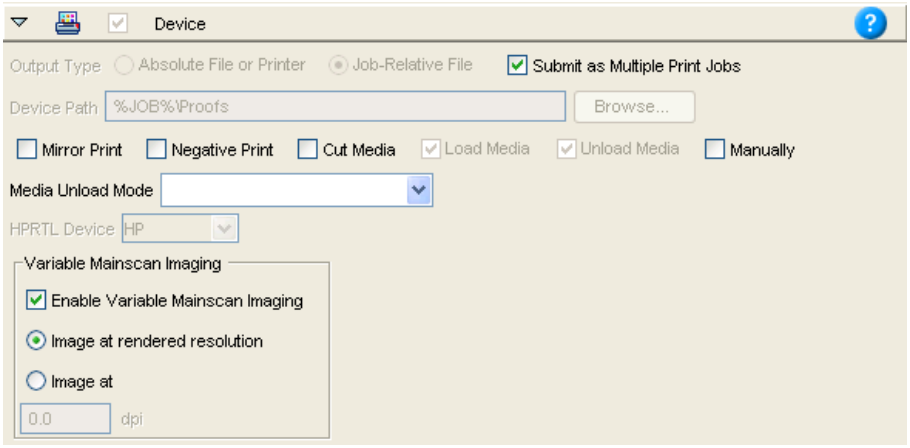
Note: This method is only available in Prinergy version 3.1.0.3 software or later.

1. Create a final output process template that has the following settings:
   a. In **Layout**, select the media size that you want to output.
   b. In **Render**, under **Device Resolutions,** type the desired mainscan resolution (to the closest integer). Make sure the **Resolution X** is always **2400**.



   c. In **Calibration and Screening**, select the desired screen system, dot shape, and screen ruling.
   d. In **Device**, select **Enable Variable Mainscan Imaging**.
2. Perform one of the following actions to apply VMR:
   - If the VMR resolution that you set up in **Render** matches the lens pitch frequency, select **Image at Rendered Resolution**.
   - If the mainscan resolution must be further adjusted, select **Image at** and specify the desired mainscan resolution, using up to three decimal places (for example, 2432.123 dpi).

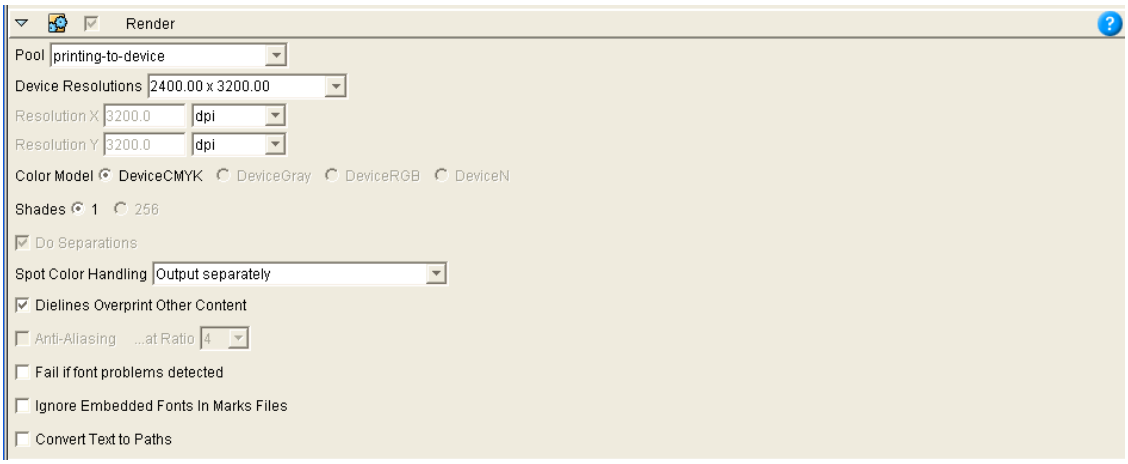
     Note: The maximum resolution that you can specify is ± 3.2% of the image's mainscan resolution.



3. Save the process template and submit an imposition to the template to output a job.

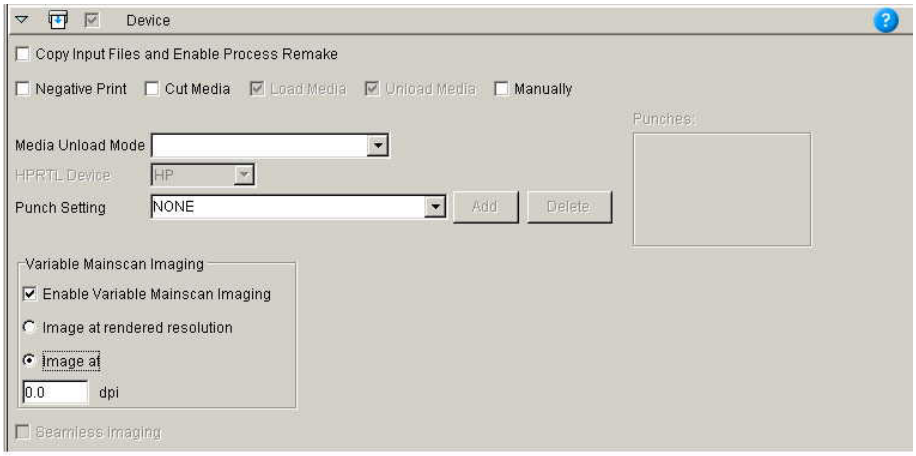
Output Using Prinergy Evo

1. Create an output from PDF or output from imposition process template that has the following settings:
   a. In **Layout**, select the media size that you want to output.
   b. In **Render**, under **Device Resolutions**, type the desired mainscan resolution (to the closest integer). Make sure the **Resolution X** is always 2400.



   c. In **Calibration and Screening**, select the desired screen system, dot shape, and screen ruling.
   d. In **Device**, select **Enable Variable Mainscan Imaging**.
2. Perform one of the following actions to apply VMR:
   - If the VMR resolution that you set up in **Render** matches the lens pitch frequency, select **Image at Rendered Resolution**.
   - If the mainscan resolution must be further adjusted, select **Image at** and specify the desired mainscan resolution, using up to three decimal places (for example, 2432.123 dpi).

     Note: The maximum resolution that you can specify is ± 3.2% of the image's mainscan resolution.



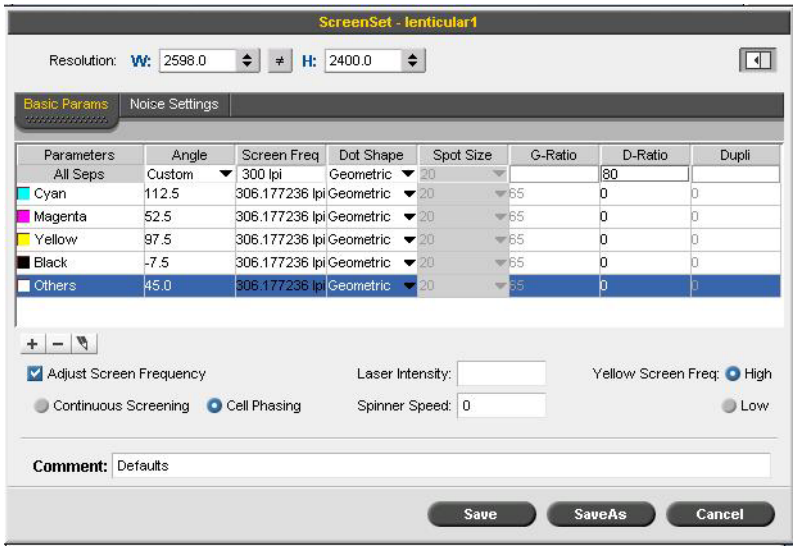
3. Save the process template and submit a PDF or imposition to the template to output a job

Output Using Brisque

Note: This is only available in Brisque version 5.1.32 software or later.

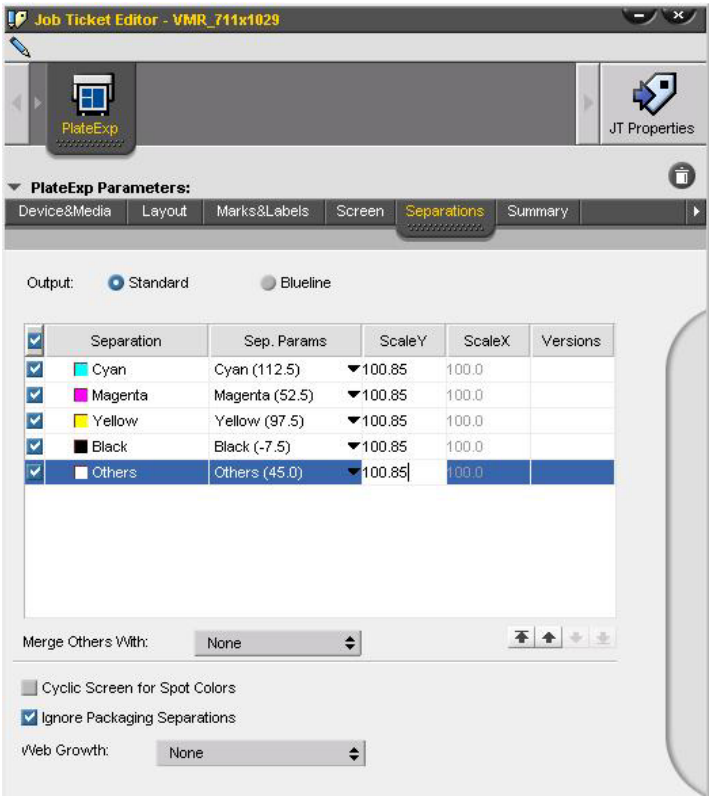
1. Define a custom screen set for the VMR job and specify the resolution required.

   Note: The **Resolution W** is the mainscan resolution and **H** is the subscan resolution, which should be 2400 dpi.



2. Create a PlateExp template using the screen set defined above.
3. If you need to make further adjustments to the output (up to ± 3.2% of the screenset resolution), enter the **ScaleY** on the **Separations** tab.

   For example, if the screen set resolution is 3200 dpi and you want to output at 3227.2 dpi, enter 100.85 (3227.2/3200 x 100) under **ScaleY**.



4. Submit the Brisque job to the process template and image the job directly on the output device.

Tips for Processing Lenticular Files

Because Kodak is not a full lenticular solution provider, we cannot provide consultation or advice on an end-to-end lenticular workflow. We can, however, provide some tips to help you get started.

Limit Check Errors During Normalizing or RIPing Interlaced Source Files

If you encounter "limitcheck" errors during the normalize or RIP, the data is probably too complex and exceeds the Normalizer or RIP limits.

Some approaches that may work, depending on the situation, are:

- Consider whether a lower resolution provides adequate quality. Simpler data is easier to process and might not affect image quality.

  Note: Downsampling is often not desirable, because it can introduce undesirable final results.

- Tile the data in the Kodak Copydot Toolkit software (2048 x 2048 tiles) and output in PDF or DCS. Use the resulting tiled data as input into a lenticular workflow.
- Using Copydot Toolkit, separate each ink channel into its own PDF file.

Suggested Screening Parameters

It is not possible to recommend a particular screen set or set of screening parameters, because every job requires different screening to optimize the final result. As a general starting point, use a line dot or round dot, 200-400 lpi, and 7.5 degree rotated angle sets.

About Kodak Graphic Communications Group (GCG)

The leading provider of graphic communications solutions worldwide, Kodak's Graphic Communications Group (GCG) offers image capture systems; professional color, copydot, and high-speed document scanning systems; inkjet printing and proofing systems; workflow and color management software; thermal imaging devices for film, plates, and proofs; high-quality proofing media, printing plates, and recording film; on-demand color and black-and-white printing systems; data storage products; and professional services. With corporate headquarters located in Rochester, N.Y., Kodak (NYSE: EK) has the largest global sales force and is committed to a digitally oriented growth strategy.

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