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**Kodak**

# White Paper

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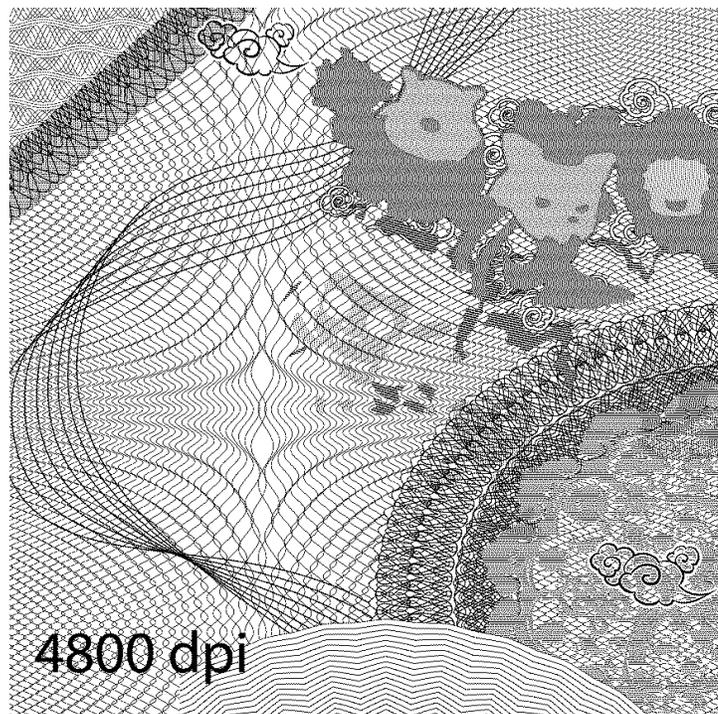
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## 4,800 / 5,080 dpi High Resolution Option

### Overview

Responding to increasing demand for higher-resolution imaging, Kodak has developed the 4,800 / 5,080 dpi High Resolution Option for all new **Kodak Trendsetter** Q400/Q800, Q1600 and Q2400/Q3600 Platesetters, factory upgrades only. This new capability can be used to image exceptionally small features with complex background patterns, or microprinting that is indiscernible to the naked eye. It is ideal for security printing applications, lenticular printing and high-resolution art prints.

The 4,800 / 5,080 dpi High Resolution Option uses a standard Thermal 2 head with a special software algorithm that doubles pixel addressability in the subscan direction, thus enabling 4,800 dpi x 4,800 dpi imaging with a 2400 dpi head, or 5,080 x 5,080 dpi imaging with a 2540 dpi head. In this document, references to 2,400 and 4,800 dpi also include the 2,540 and 5,080 dpi version, unless otherwise specified. The minimum isolated feature size is unchanged at approximately 10 microns wide in the subscan direction, but the improvement in addressability means that pixels can be placed at any location on a 4,800 dpi grid. This results in smoother fine lines, features, and small font text. Throughput is reduced by approximately half for **Trendsetter** X-speed devices, but only for high resolution jobs. Regular jobs at 2,400 dpi can still be imaged at full throughput.



## Applications

Kodak continues to recommend standard 2,400 dpi imaging for most applications. The effect of higher resolution can only be seen on very fine features viewed under magnification, so higher resolution should not have a visible impact on image quality for most jobs. However, the new 4,800 / 5,080 High Resolution Option opens opportunities for the following applications:

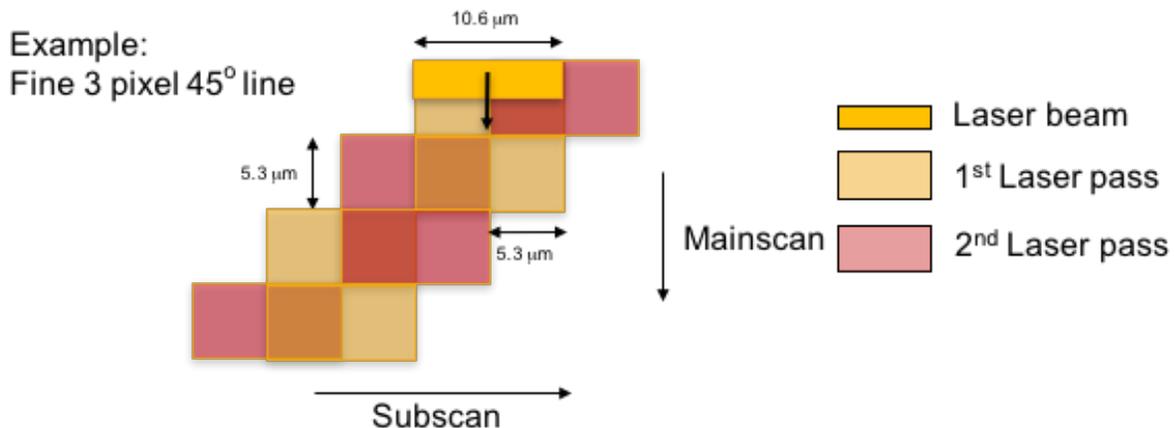
**MICROPRINTING (SMALL TEXT) / GUILLOCHE (SWIRLING PATTERN):** Extremely detailed output can be used for high resolution art printing and for accurate reproduction of the small text sizes that are required for bond and other certificate printing. Text is generally small enough to be indiscernible to the naked eye.

**SECURITY APPLICATIONS:** 4,800 x 4,800 dpi resolution can be used to image small, highly detailed features that are difficult to reproduce, so that copies are visibly distinguishable from the original. Typical images include main image components overlaid by a secondary pattern of fine lines, background patterns of wavy lines of variable width, and very small font text.

**LENTICULAR APPLICATIONS:** Variable mainscan resolution (VMR) allows printers to accommodate slight variations in the lens pitch. With 4,800 dpi fixed resolution now available in both mainscan and subscan, the base images can be rendered with a high level of detail, resulting in impressive 3D, motion, flips, or morphing effects.

## How it works

Higher resolution in the mainscan (around the drum) direction is not new; it has long been available through the Variable Mainscan Resolution option. The resolution in the subscan direction is set with the internal optics of the thermal head. At 2,400 dpi, each pixel is 5.3  $\mu\text{m}$  high by 10.6  $\mu\text{m}$  wide, and previously, pixels could only be placed on the 2,400 dpi grid with allowable pixel positions spaced 10.6  $\mu\text{m}$  apart.



## Media

Due to the fine features that may be imaged, this option requires high resolution media. For offset production, **Kodak Electra XD** and **Electra MAX** Thermal Plates are currently the only qualified plates. **Kodak DITR** Media with narrowed swath is under evaluation.

## Throughput

When imaging at doubled resolution, throughput is reduced by approximately half. The carriage speed is reduced so it advances by half a swath per drum revolution, thereby doubling the imaging time. In addition, the thermal head has a lower maximum drumspeed for imaging at higher resolution in the mainscan direction. This may also cause an increase in imaging time depending on the device and media.

The overall effect on throughput depends on the rated speed of the device. On **Trendsetter** F-speed devices, the impact is less because the imaging time is a smaller proportion of the total cycle time for one plate.

The throughput for jobs imaged at 2,400 dpi is unchanged from a device without the 4,800 / 5,080 dpi High Resolution Option (i.e. standard F or X speed). See the CTP Media Imaging Performance Database for details of the throughput for each configuration.

## Screening

**Kodak Prinergy 7** Workflow supports the following types of screening at 4,800 dpi:

- **Kodak Maxtone** Screening: **Maxtone** Screening is available in the full range of dot shapes and line rulings, at 4,800 and 5,080 dpi.
- **Kodak Staccato** Screening: Currently, **Staccato** Screening at 4,800 dpi as a pixel-doubled version of **Staccato** Screening at 2,400 dpi. **Staccato** will be upgraded in a future version of Prinergy so that it demonstrates true 4,800 dpi feature sizes. **Staccato** at 5,080 dpi will also be made available.
- **Kodak Maxtone SX** Screening: **Maxtone SX** Screening is available in **Prinergy** Workflow up to 200 lpi at 4,800 dpi. **Maxtone SX** Screening will be available with an extended linescreen set and at resolutions up to 5,080 dpi in Prinergy 8 Workflow.

## Combining with other feature licenses

The 4,800 / 5,080 dpi High Resolution Feature can be combined with the following license:

**VARIABLE MAINSCAN RESOLUTION:** You can use the VMR and 4,800 / 5,080 dpi options at the same time. This would be suitable for a lenticular printer looking for the ability to image highly detailed work. With VMR-96, the subscan (along the drum) resolution is fixed at either 2,400 (2,540) or 4,800 (5,080) dpi and the mainscan (around the drum) resolution is variable up to 9,600 dpi. In practice the 9,600 dpi is probably higher than needed and is also subject to plate capabilities. A lenticular printer might choose to image at 4,800 x ~4,800 dpi using the high resolution feature, and apply the VMR option to vary the mainscan resolution to precisely match their lens pitch. Of course, they can also use VMR on its own with 2,400 dpi in subscan; this is a common configuration for lenticular printers today. For security printing of fine lines and microtext on non-lenticular substrate, VMR is not necessary and the printer would only need the high resolution feature.

### About Kodak

As the world's foremost imaging innovator, Kodak helps consumers, businesses, and creative professionals unleash the power of images, information, and printing to enrich their lives.

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