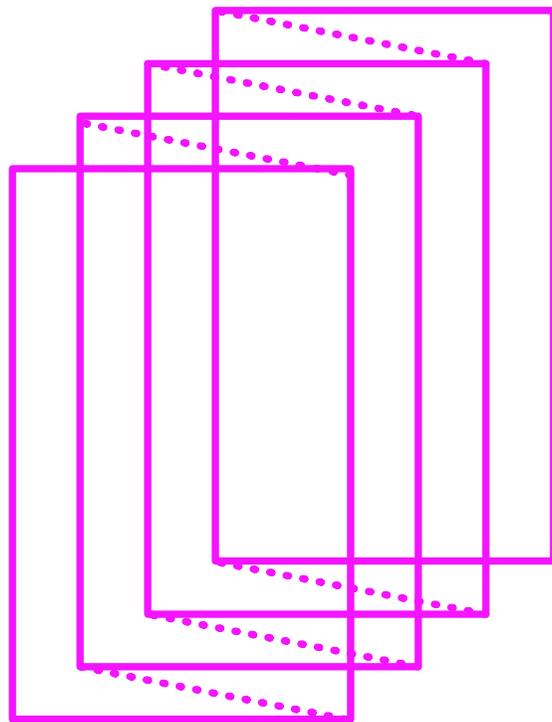


RISOGRAPH PRINTING

A HOW-TO GUIDE



EAM HOW-TO GUIDE

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E M M L A B

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WHAT IS A RISO PRINTER?



The Risograph (or riso) is a stencil-based duplicator.

Think of it as a screen printer in a printer/photocopier's body.

Image: Risograph printer, side view.

Why do we like riso? This printer has some practical benefits: it's designed to produce high-volume, low-cost, high-speed duplications, which makes it ideal for zines, pamphlets, posters, artist prints, and other kinds of interesting ephemera. Its ink is also translucent and vivid, lending itself well to punchy and unexpected colour profiles that can really pop on the page.

The riso's eccentricities also have a green touch. It uses much less electricity than laser printers (which essentially work by melting plastic onto your page) and uses rice bran oil in its ink, along with rice paper for making its masters. This lowers the environmental impact and pollution associated with printing.

Riso printing has its downsides and “quirks” too—it's just that we also often find them to be charming. The printer doesn't duplicate perfectly, and setting things up requires a bit of skill and trial-and-error, and chance. This means that riso prints look like riso prints—not a generic booklet from Staples—and that each is somewhat unique. There's also a skill to be found in learning how the riso 'thinks' and 'sees', converting digital files or scans into a very analog output via screenprinting. This mix of original and copy, high and low art, and analog and digital methods makes the riso a delightful media studies case.

MECHANICS: HOW DOES A RISO WORK?

Risos work through a stencil-based printing process. Here's a short explanation of how it works:

Master Making: The process begins with creating a master copy (or copies, if printing multiple layers) of the project to be printed. The digital design is sent to the riso from a computer, or the analog design is scanned through the scanner bed, and transferred onto the master. This master is typically a thin, perforated sheet, which will allow ink to travel through (think of it like a screen printing screen).

Ink Application: The riso mounts the master on the ink drum. Paper is fed under the ink drum as it rotates, and ink is pushed out through the stencil to create an impression.

Each ink resides in its own portable drum that is moved into and out of the riso as needed. While some larger riso units can hold multiple drums at the same time, some, like the EMM lab's, can only hold one.

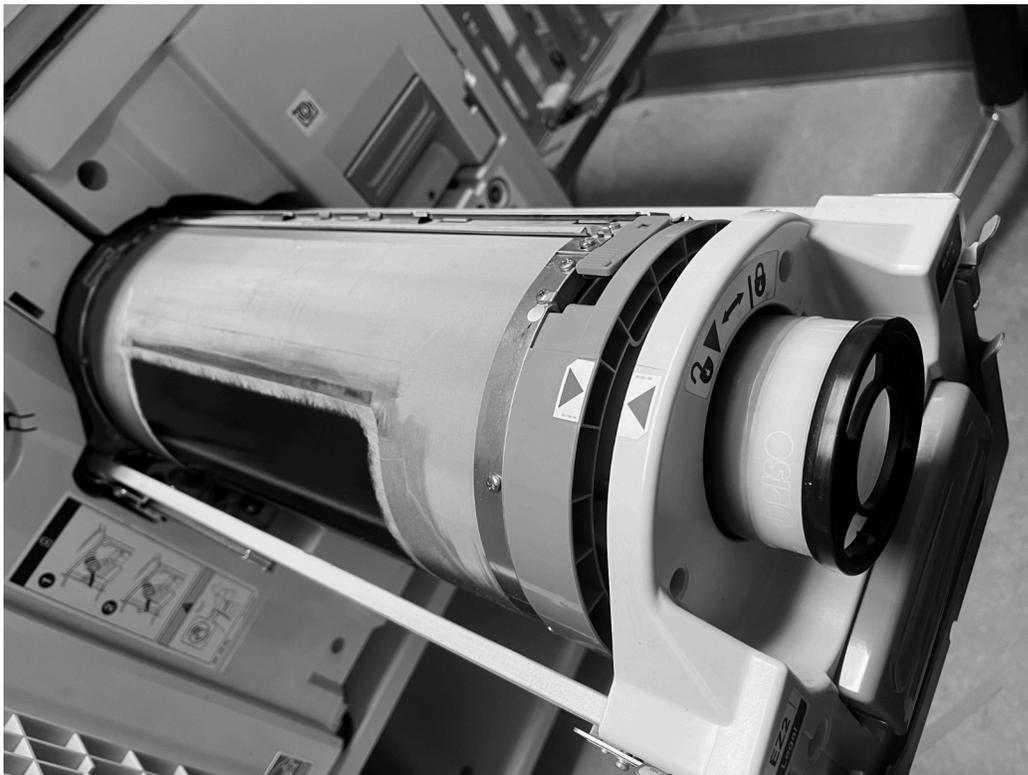


Image: ink drum ejected from front of riso.

PLANNING YOUR DESIGN: COLOURS, LAYERS, AND MISALIGNMENTS

Whether you're designing digitally on a computer or analog by hand with plans of using the scanner bed, planning your design from the beginning with the quirks of the riso in mind will help to avoid possible printing issues.

1. Limit your color palette. Riso prints usually use a limited number of colours. Find out the ink colours you have available, and plan your design with them in mind.
2. The riso prints through picking up tones, not individual colours. This means that the printer is very sensitive to black and will pick up different shades. If using a digital source, converting your source image or document to grayscale will help make sense of the various tones in your image. If you're working with drawings on paper, try using a lightbox or holding your papers up to a bright window to see how your layers and tonal changes will interact. Doing this will allow you to adjust print settings as needed, especially for lighter colours like yellow.
3. Design with layers in mind. Each colour is printed separately, so create your design in layers, one for each colour. Also consider opacity and limiting the number of layers to avoid oversaturation of the paper.
4. Plan for Misalignment. Slight misalignments can occur when printing with a riso, giving a unique look. Avoid tight outlines, and consider adding trap lines (overlapping edges) to minimize the impact of misalignment.

DESIGNING DIGITALLY WITH AFFINITY

The EMM Lab has the Affinity Suite installed on our print lab computer. Links to video tutorials can be found under “resources”, but here are some basic steps and considerations:

1. Prepare Your Project:

- Find Software: Locate *Affinity Designer* or *Affinity Photo* on the lab computer, as these are best for creating and editing most projects.
- File Setup: Start with a new document, setting the dimensions and resolution suitable for your intended print size. 8.5 x 11 and 8.5 x 14 paper sizes are the easiest to print, but they can always be trimmed to any size by hand.

2. Designing with Riso Intricacies in Mind:

- Refer back to the previous section, “Planning Your Design”, for basic notes on colours, layers, and misalignments.
- Project Size: Remember that the riso cannot print to the edge of paper, so plan around this. If text or images get too close to the edge of your design there’s a risk of them being trimmed off when printing. In Affinity under the “view” tab you can turn on the ability to show “bleed”, which is the area which will be trimmed off if entered into.
- Use Layers and Groups: Organize your project using layers and groups to easily manage and edit different parts of your project. This includes a separate layer or group for each colour, as this will help later on with file saving.

3. Exporting and Labelling Files:

- Exporting for the Riso: When exporting your project for printing, ensure you export each colour layer as a separate PDF or JPEG file.
- Label Files: It’s helpful to label each layer file with the corresponding colour.

4. Confirm Your Design :

- Test Print: Before finalizing your project, do test prints on your riso to check print quality and adjust sizing, placements, and opacity as needed.

HOW TO PRINT WITH A RISO

1. *Preparing Your Digital or Analog Project:*

- Digital File Format: Make sure your project is in a suitable format, such as PDF or JPEG.
- Paper and Scanner Bed: Make sure that your project is readable for the scanner bed. As it picks up tonal changes, it will pick up shadows from creases and lifted edges, as well as textures from mixed-media.
- Colour Separation: A reminder that risos use single-colour ink drums, so you need separate digital files or paper sheets for each colour layer if using multiple colours.

2. *Setting Up the Printer:*

- Power on the riso printer and let it warm up.
- Load your choice of ink drum into the printer by opening up the front panel.
- Place paper into the paper holder on the left side of the printer. Start with some scrap paper for the master and test copies. Make sure that the paper thickness correlates to the size on the toggle (thinner/regular stock paper to the left—cardstock to the right). If you're printing multiple layers, thicker paper will be best.
- Adjust the settings for paper size, orientation, and print quality as needed on the computer for digital files, or on the top-left panel of the riso if using the scanner bed (instructions on next page)

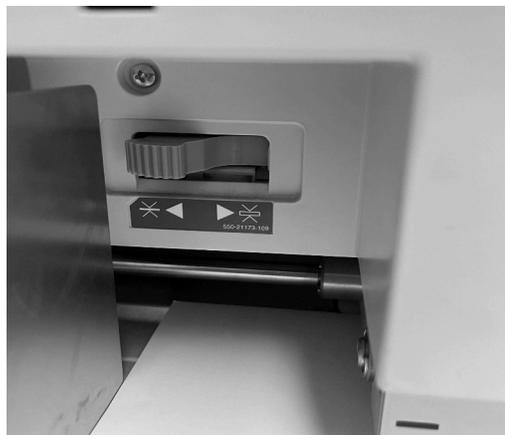


Image: Paper thickness toggle, found above paper tray

To customize print settings when printing digitally:

On the print menu, select the RISO EZ 2x1U from the printer dropdown. Click on “properties”.

In the “Basic” and “Layout” tabs, be sure your “Original Size” is set to Letter or Legal (depending on file size), “Paper Size” is “Same as original”, and your “Orientation” is set to Portrait.

In the “Image” tab, you can set your half-toning patterns. Screening Type is either Grain-Touch or Screen Covered, and determines how the riso converts your digital image into a physical stencil (the master):

Grain-Touch: Creates a random dither pattern. It’s good for illustration (unless you want the half-tone dotted look). Once Grain-Touch option is selected, the screen frequency/angle settings are not available.

Screen-Covered: Creates a classic halftone pattern (visible, organized dots). It’s good for photography or a more textured/”classic riso” look. We can adjust the frequency and angle.

- **Screen Frequency:** Controls the size of the dots produced. Higher numbers means smaller and more dots, making them less visible.
- **Screen Angle:** Controls the angle that the pattern is set to, to avoid overlapping patterns and layers overlapping unevenly.

To customize print settings when printing with the scanner bed:

On the top-left panel of the riso you’ll see a control panel with buttons “line mode”, “photo mode”, “scanning level”, and size adjustments (by %).

Line Mode: This mode is usually used for documents that contain primarily text, charts, or line-based illustrations.

Photo Mode: This mode is usually used for documents or images that contain photos or detailed graphics.

Scanning Level: Adjusts the scan resolution/brightness and darkness to determine the level of detail captured in the scanned image.

Size Adjustments: Converts the scanned image to be smaller or larger, by the percentage chosen.

3. Printing:

- Master Making: When printing from a computer the riso will automatically make a master when you press print. Make sure to select one page at a time to print. If you're printing from the scanner bed, look to the right panel and press "Master-Making". Press "Start" to print. Make sure to double-check the orientation of your original image on the scanner bed to avoid image cutoffs.



Image: Right panel of riso, with "Master-Making", "Stop", and "Reset" buttons, as well as number pad to input number of copies.

- Test Print: Always do a test print to check alignment, colour registration, and overall quality before printing your entire run.
- Good Copies: Once you confirm that everything looks good, input how many copies you want and press "Start" on the panel shown above. This should be done on the panel whether you're printing with the scanner bed or computer. If you try to print again from the computer, even with the same file, a new master will be made!
- Colour Layers: To print another colour layer, you have to repeat the steps above. Change the ink drum to the next colour you want, change the paper on the glass sheet, make a master layer, and make some test copies by using used paper.

4. Post-Print Ink Drying:

- Allow the prints to dry completely, as riso ink takes time to dry. The more saturated the paper, the longer it will take!

TIPS, TRICKS, AND TROUBLESHOOTING

If you're encountering paper jams: If you're using a thicker paper, remember to toggle to adjust the paper feed. You can adjust the speed of printing on the top control panel (if printing large quantities and there are jams, try slow and steady!)

If the riso doesn't print: Turn it on and off again. Check for error lights on the machine (and decode them using the chart on the lid). If using a computer, clear the print queue and try again.

If your print is incredibly faint: The first few prints in any run will be light (as the drum gets its ink flowing). If, after about 10 prints, you're still not seeing the tone you want, you'll need to make a new master with different settings:

If using the scanning bed, adjust the darkness settings (and make sure you're using the pencil setting for finely detailed source images).

If you're printing with the computer, increase the tonal value of your source layer and consider working your layers in greyscale (the riso 'sees' in black and white, not RGB/CYMK, and so will always print lighter colours like yellow very faintly).

If your print smudges/gets track marks on the top: You probably didn't wait long enough between passes for the ink to dry. These marks can be erased with an eraser. If time isn't the cause...

Other paper and ink issues:

You may be using too much ink for your paper type. Some paper—like cotton/heavier weight papers—are better at absorbing and holding ink (never use glossy paper in the riso!).

You may be using too much ink in your design. Printing with 100% ink (i.e. from a 100% black source image) looks really cool, but can cause problems if you have very large areas of ink, and if you're printing multiple layers of heavy ink. Try lightening your layer design.

You'll get less smudges if you print your darkest layer last.

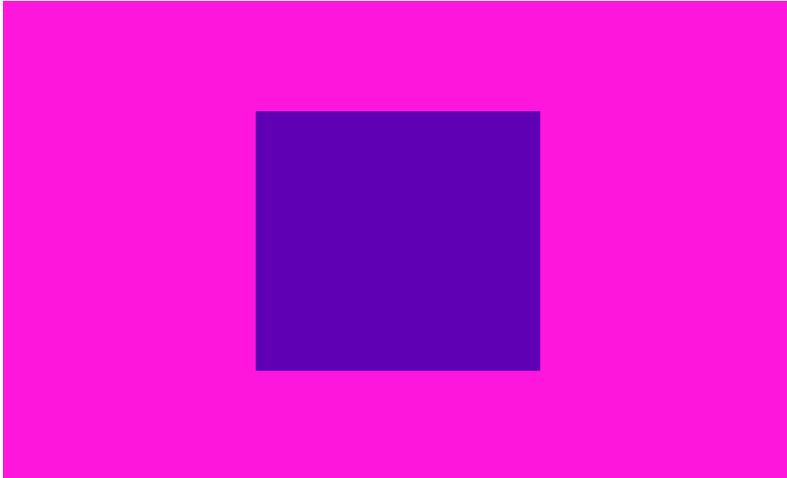
The easiest way to get rid of smudges is just to run 100 or so copies of something through the machine until it wears off. Use scrap paper (that's dry!).

If your text is "dotted": This can usually be avoided by using over 12 pt font. If using 12 pt font and lower (and printing digitally from InDesign or Affinity) try setting font colour to registration black.

If your print layers are misaligned/jittery: A little jitter is normal with riso prints, and varies from print to print in a print run. So, printing more than you need, and recycling the worst prints in your run, is one strategy. Major layer offsets can be created when you misalign source images in the scanner bed. Try to be precise in lining up your scan every time. Because jitter is expected, it's a bad idea to print multiple layers of colour for small details (especially text). Knockout (or cutout) designs work much better (example on next page). It's also a good idea to 'trap' your design layers, so that everything slightly overlaps. This helps avoid weird white gaps between print layers.

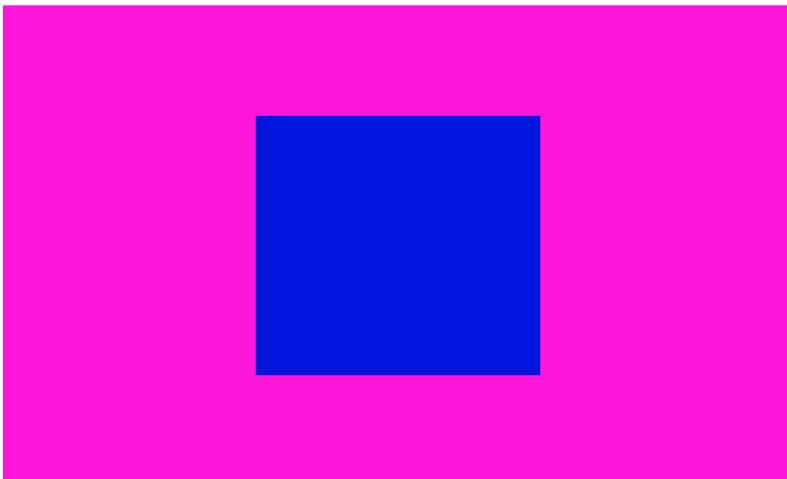
OVERLAY PRINTING

Example: Blue box is printed directly overtop of pink background, creating a new colour (and more saturation from layers of ink)



KNOCKOUT PRINTING

Example: Blue box is printed over pink background, with white space cut out for blue box to be printed over (no colour mixing, less saturation of ink)



HELPFUL RESOURCES

Our Printer's Print Driver and Manual: www.riso.com/download/driver/ez5x1_3x1_2x1/ez5x1_3x1_2x1_cd107f_64bit.html

EMM Lab YouTube Tutorials:

Intro to the Riso (Ink and Scanning Basics): <https://tinyurl.com/3mckdy8p>

Affinity: Basic Tonal Conversions and Print Settings: <https://tinyurl.com/ycjd7jkm>

Affinity: Duotone Images in Affinity Photo: <https://tinyurl.com/3283w9p2>

General Riso Resources:

Book: No Magic in Riso Risograph (available in lab)

Risograph Wiki: www.stencil.wiki

Advanced Digital Print Settings:

Advanced Print Setup (ink and gradients explained):

<https://tinyurl.com/ywujpunk> (RISOTTO Studio)

File Preparation in Photoshop (converting images for colour separation explained):

<https://tinyurl.com/2nha943n> (University of Illinois)

Downloadables and Apps:

Riso-friendly Colour Separations (Mac Only): <https://spectrolite.app/>

Downloadable Colour Profiles: <https://colorshift.theretherenow.com/>

Program for Riso-friendly Art: <https://antiboredom.github.io/p5.riso/>

Free Basic Print Template: <https://risottostudio.com/pages/print-setup-templates>

Advanced Digital Print Settings:

Advanced Print Setup (opacities, ink coverage, and gradients explained): <https://tinyurl.com/ywujpunk> (RISOTTO Studio)

Risograph File Preparation in Photoshop (converting images for colour separation explained): <https://tinyurl.com/2nha943n> (University of Illinois)

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EMM PRINT LAB: MATERIALS AVAILABLE

Colours Available:

Black (hex colour code: 000000)

Yellow (hex colour code: FFE800)

Fluorescent Pink (hex colour code: FF48B0)

Bright Red (hex colour code: F15060)

Medium Blue (hex colour code: 3255A4)

Paper Sizes (use paper marked for public use ONLY, or bring your own):

letter (8.5 x 11) or legal sized paper (8.5 x 14)

Finishing Materials:

Paper cutter/paper guillotine

Cutting Mat

X-acto Knife

Staplers (long edge)

EMM PRINT LAB: RULES

Access: Access to the print lab is for approved users only. Please contact custmdstequipment@trentu.ca to discuss access to the lab.

Safety: Know the location of emergency exits (if leaving because of an alarm, remember to close the door behind you!) and first aid kit (top shelf, blue bag). Report any accidents, injuries, or unsafe conditions immediately to custmdstequipment@trentu.ca.

Equipment Usage: Familiarize yourself with the proper use and operation of the Risograph printer and other equipment, including cutting tools and staplers. Use equipment for its intended purpose to avoid breakage or injury. Do not attempt to repair or adjust equipment unless trained and authorized to do so—email custmdstequipment@trentu.ca to report damage.

Print Material Handling: Handle all lab materials with care, and especially ink! Inks can smudge and stain on both paper and hands! Store materials in designated areas, and dispose of waste properly (paper products in recycling bin, found beside work table).

Cleanliness and Organization: Keep the work area clean and organized for yourself and others. Clean up lab after each visit and return equipment to their rightful places. If you need to leave a project in progress to dry, please leave in an organized, labelled pile. Remember that this is a shared space, and the lab is not responsible for any misplaced, moved, or missing work.

EZ2

Legal

BLACK

ブラック

CAUTION For continued protection against possible risk of fire, use only ^{JH} Riso Kagaku Corp. inks bearing a UL Classification Mark. JS-1L 023-17319-103



Print Cylinder
Release Button



054-17003-004

COPY COUNT MASTER COUNT