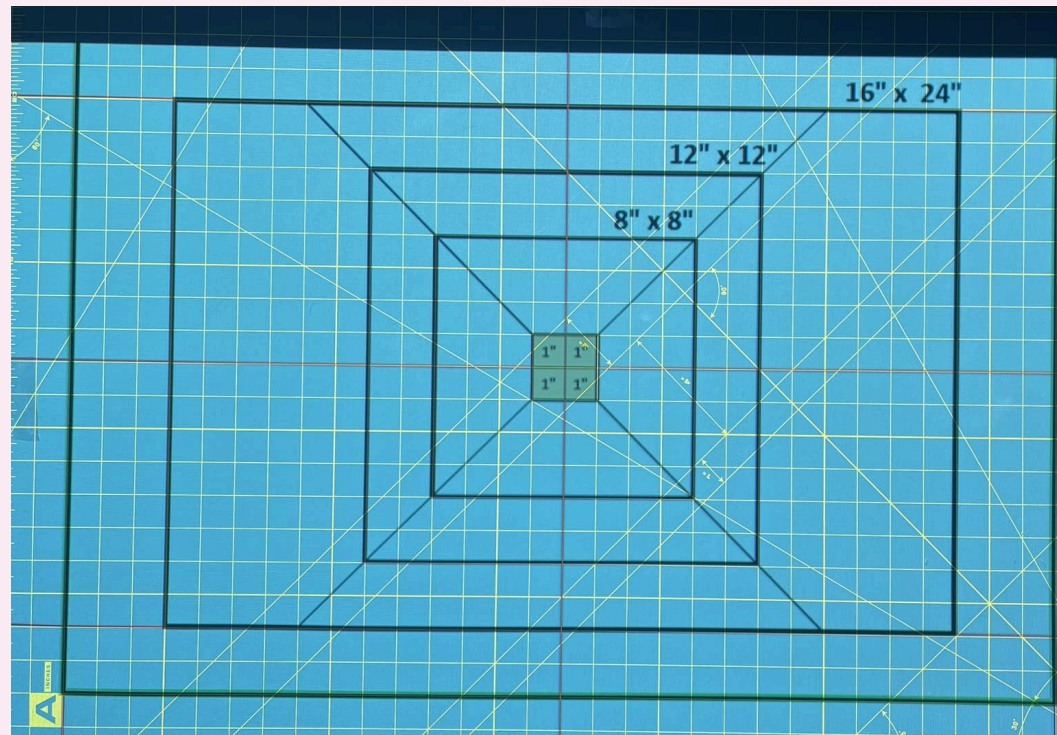


Projectors for sewing

Setup and Calibration Guide

Prepared by Sasha Sewist
(Updated March 2024)



Update: calibrating a projector using manual method in this guide is no longer recommended! Instead use the automatic calibration software tools created by members of the Projectors for Sewing FB group.

Updated and much simpler guide, with clickable links:

<https://bit.ly/onepageguidetoprojectorsewing>

Help with steps is always available in the Projectors for Sewing FB group.

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Other ways to learn:

If you would like to pay for personal calibration help via video chat, sign up for one-on-one calibration support with Missy Pore, the founder of the Projectors for Sewing group:

One-on-One Support - Missy's Projector Calibration Help: bit.ly/MPChelp

Other helpful resources include tutorials by members of the Projectors for Sewing FB Group:

Branalyn's Dailey Sews website: <https://www.daileysewsandstuff.com/>

And Youtube Channel: <https://www.youtube.com/c/DaileySewsStuff>

Sheredith's website tutorials: <https://projectorsewing.com/>

1.0 What you need to Setup and Calibrate a projector for Sewing

1.1 Projector connected to our device/computer

Computer/Device:

Any windows or Mac laptop or computer will work with any projector and is the best option for projecting from. Projectors are not computer specific, and basic computer models work fine for our needs.

Avoid any Chromebook tablet or laptop, there isn't the software we need available.

Android tablets / phones or iOS phone are ok but the software we use Xodo pdf reader doesn't have a typable zoom so you have to get used to finger zooming to accurate scale. iPads are best mobile device for projecting as they can use the paid

Affinity Designer app, which has a typable zoom. More info in section [4.1 Mobile devices \(iPhones, iPads, Android mobile devices\)](#).

Projector:

- **For information on selecting a projector, see [Projector Types and Models guide](#)**

Projector *must* have native resolution of at least 720p (for example: 1024x768, 1280x720, 1280x800), except if it is an Apeman or Wowoto models (These are the only low resolution projectors that have calibrated correctly - due to special aspect ratio settings they have that ensures image is not distorted.)

Connecting projector to device/computer:

Usually we use duplicate/mirror mode so everything on our computer/device screen appears on projection (Alternative is extended mode where computer and projector are on each side of a large shared desktop.)

- On Windows, press Windows key and P, and select Duplicate in the panel that appears on right side of screen.
- On Mac, go in System Preferences>Displays, and set projector to Mirror mode.
- These steps above on Windows/Mac are for connecting via HDMI on projector - make sure Source menu on projector is set to HDMI.
- If connecting wirelessly or by USB-B port on projector (square plug), screen will duplicate in a different way. See specific steps in section [4.0 Projector model or computer/device specific info](#)

- **For information on what port/plug to use to connect, see our new guide: <https://bit.ly/pfs-portsguide>**

1.2 PDF Reader software installed on computer or device

Mac or Windows:

- **Adobe Acrobat Reader DC (free version).** Download Adobe from here: get.adobe.com/reader
- Windows S mode : you will need to change to regular Windows mode to install Adobe. See [section 3.9](#) for more info.

Mobile devices (iOS or Android) including tablets and Chromebooks (see [section 4.1](#) for info on calibrating these devices):



● **Xodo PDF Reader** (free version, messages about upgrading to premium can be dismissed with the X in the corner of screen):

- iOS App Store: [Xodo PDF Reader & Scanner on the App Store \(apple.com\)](https://apple.com/xodo)
- Google Play Store: [Xodo PDF Reader & Editor - Apps on Google Play](https://play.google.com/store/apps/details?id=com.xodo.pdf.reader)

There are other PDF apps on computer that can be used but this guide is written for using Adobe or Xodo. For our needs, PDF app on computer needs to have access to layers, image rotation feature , and full screen mode, zoom adjustments in small increments, and ideally typable zoom.

Once you understand the basics of calibrating and projecting patterns with Adobe Acrobat Reader, you may want to upgrade your skills to learn Inkscape, a free vector illustration software (Windows, Mac or Linux computer required), which can be used to project patterns as well as making digital pattern adjustments for fitting or style changes. There's more steps to learn Inkscape when first starting, but once the basics are understood, there are many [advantages](#) to using Inkscape to project patterns instead of Adobe Acrobat Reader, and you can start learning with this guide: [The beginner's guide to Inkscape 1.3 for projector sewing](#)

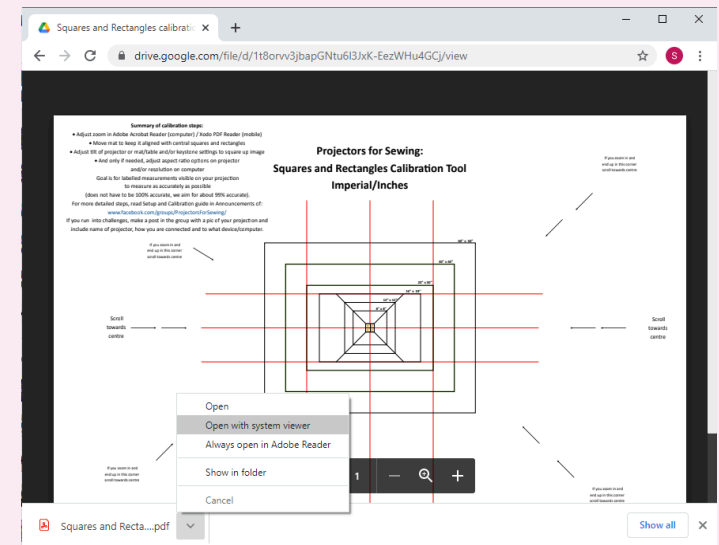
1.3 Squares and Rectangles Calibration Tool PDF open and in full screen mode

Here are links for the Squares and Rectangles Calibration Tool PDF needed for calibration. If you are using cutting mat, check if mat's grid is in inches or centimetres. Click here for the calibration tool you need, and if it opens the pdf in your browser, press **Download icon in top right** when file opens.

- [Imperial/Inches Squares and Rectangles Calibration Tool PDF](#)
- [Metric/centimetres Squares and Rectangles Calibration Tool PDF](#)

In **Chrome browser** you may also need to:

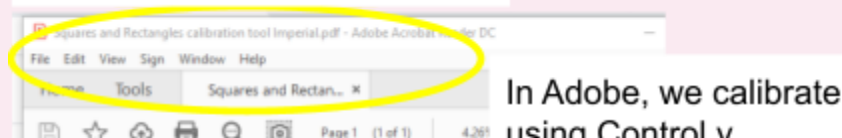
- **Click up arrow on file and select “Open with System Viewer” so the PDF opens in Adobe.** Make sure Adobe is already installed on your computer, see below for links. **Select “Always Open in Adobe” is good to do as well.** Just clicking “Open” or clicking filename opens it in a Google PDF viewer, which won't work for us.



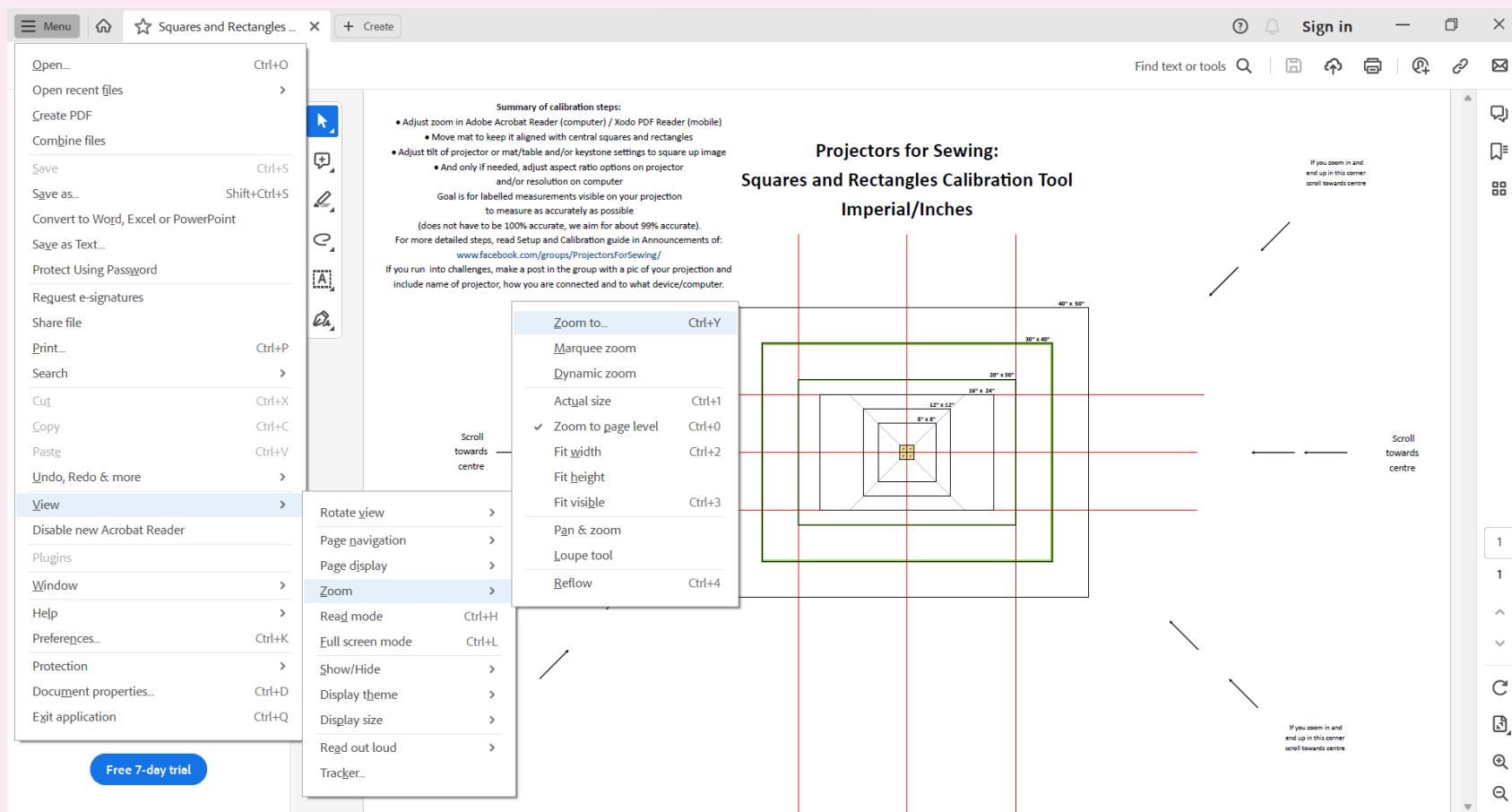
What you should see when you are in Adobe:

Old interface:

Check that your menus look like this to ensure PDF is open in Adobe Acrobat Reader



New interface:



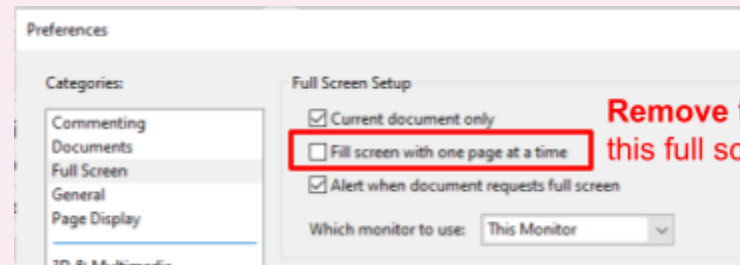
Adobe is slowly rolling out new interface for Adobe Acrobat Reader. If your Adobe looks like this you have the new interface, and all functions we need are in the three lines menu in top right (instead of menu bar across top). You can go back to old interface by clicking in menu “Disable new Acrobat Reader”.

See pic above for accessing zoom function with menus (View>Zoom>Zoom to:), learning the keyboard short cut (Control Y on Windows, Command Y on a Mac) will be quicker.

If your screen does not look like either the old or new interface of Adobe pics above, then the calibration tool is still open in your browser. Go to downloads folder to find calibration file downloaded by browser and open in Adobe.

Key Tips for Adobe - to solve full screen zoom problem:

1) To maximize space in Adobe, we use **Full Screen mode**. But before changing to that mode, one preference needs to be changed so zoom is not affected. In Adobe menu (Edit menu on Windows, Adobe Reader menu in top left on Mac), access Preferences, then click in the “Full Screen” section and **UN-click “Fill with One page a time”**.



- 2) **Once that setting is changed, toggle between Full screen and regular mode using Control L (Windows) Command L (Mac)**. In full screen mode we move calibration grid using arrow keys until it is centred on our mat. We also move our mat to adjust alignment.
- 3) **To access the zoom function in full screen mode, use Control Y (Windows) Command Y (Mac)**. Don't select pre-set zoom options with mouse, instead we just type a number (down to 0.1% level of accuracy) and press enter. **Write down Control Y/Command Y shortcut, we use it regularly to check that your zoom is correct when cutting.**
- When you first change your zoom the adobe window may only show the text in the top left of the Calibration tool - scroll to centre so you can see the boxes.

1.4 Fully flat surface

- Unevenness in surface, like seam in a folding table, or warped mat will make calibration harder, and in places not possible. If unevenness leads to only minor misalignment that is OK. Run a marble across surface in different directions to spot the uneven areas. Cardstock under some areas of mat can help compensate for uneven table/floor.

1.5 Tape measure and/or cutting mat with grid to calibrate against

- We measure projected boxes from calibration tool and/or align projected boxes with cutting mat. Ideally we do both, but using just a tape measure and no cutting mat grid it is also possible to calibrate accurately.
- Cutting mats can be any colour. When projecting patterns, colour of mat will be hidden by fabric.
- If mat is clear/white or dark, it is best to “reverse colours” in Adobe or Xodo to improve visibility of lines.
 - **Reverse colours in Adobe on computer:**
 - In Adobe preferences (on Windows use menu Edit>Preferences, on Mac, use “Adobe Reader menu on upper left next to  menu and select Preferences), click “Accessibility” and then click ON Replace Colors. You can choose “High contrast” or your own preferred colours if you wish. Make sure “Only change black lines and text” is clicked OFF and “Change lines as well as text” is clicked ON.
 - **Reverse colours in Xodo PDF Reader on mobile devices:**
 - In Xodo PDF Reader, tap gear icon menu, then tap “Night mode”
- When using only a tape measure, measure all sides of the largest boxes and make adjustments until measurements of boxes are accurate. Measure from centre of lines.

2.0 Calibrating

2.1 Calibration Goals

To avoid distortion in our patterns, we calibrate our projector to check three things:

- Image and projected rectangles need to be “square”/ have 90 degree corners (we adjust table and/or projector tilt and/or projector keystone settings to achieve this)
- 1 digital inch in a pattern file has to measure 1 inch in real life (we adjust zoom to achieve this, and we use large distances to check zoom accuracy, because a single 1” test square does not give us the level of accuracy we need when projecting (due to projected lines being fuzzier than printed lines).
 - “Digital inches” / scale of PDF files is the same across all files, so we always set them to the same zoom.
 - On computer this is done by entering the “calibration zoom” in all our patterns when we open them.
 - On mobile (phone/tablet/chromebook), there is no PDF app where we can type a zoom, so we have to zoom by fingers each time we open a file. More tips for accurate zoom on mobile are included in the [Top Tips guide](#). The exception is iPads, which Affinity Designer app has typable zoom, but it is more complex to use.
- Image needs to not have a distortion that stretches squares into rectangles. This is aspect ratio distortion, and we adjust projector aspect ratio settings and/or computer display resolution or change from mirroring to extended mode to achieve this, if we run into this problem. More info in section [4.1 Aspect ratio problem/Squares stretched into rectangles](#).

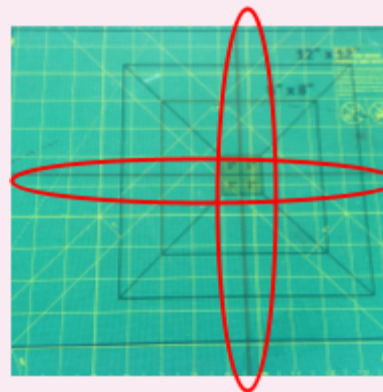
2.2 Calibration Steps

See more details in section [2.0 Additional Helpful Info and Tips](#) and section [4.0 Calibration Troubleshooting Examples](#) if needed.

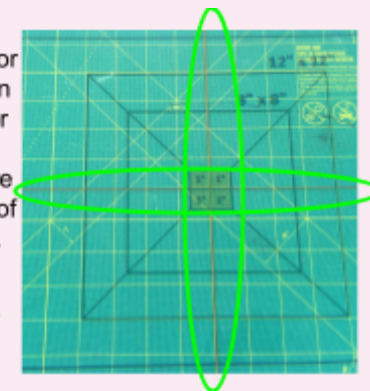
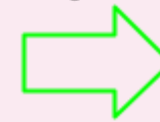
Open the calibration tool PDF (see [section 1.0](#)) in Adobe or Xodo, then follow steps below. We can do these steps in any order, but usually tilting and zooming are done in conjunction. Aspect ratio issues should be solved as soon as they are discovered, as no amount of tilting or zooming will help. Note however if an aspect resolution issue and tilting are happening at same time, fix the tilt first (square up image) otherwise it will be hard to see when aspect ratio issue is solved. Similarly, sometimes we may suspect an aspect ratio issue but it is actually a tilting issue, so if not sure, continue with tilting and zooming.

- **Align Central Axes:** Align long horizontal and vertical lines coming out of centre of calibration tool to be on top of mat grid lines (if using a mat). **Everytime you adjust tilt or zoom do this realignment .**

In this image, the zoom is too small, but before changing zoom, we have to align the central axes with mat grid lines. In Adobe either use arrow keys, or for more precise moving of the calibration tool click in the middle of the Adobe window and drag the projection where you want projected lines to be. Moving mat is another way to align.



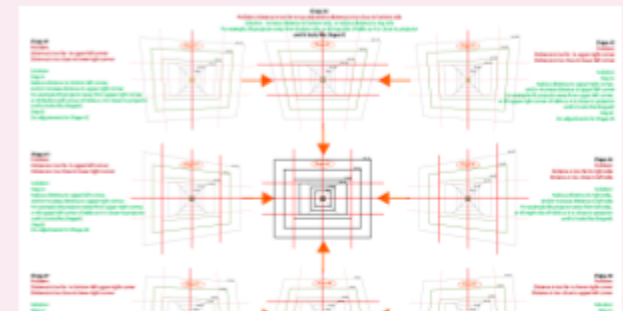
Move mat and/or scroll projection on computer or device until central axes are aligned on top of mat grid lines.



the
to

- **Square up image so corners of image and of projected rectangles are 90 degrees.**
 - via tilting/physical adjustments of angle of projector/and or table/surface, or as a second choice using keystone dial or settings on projector.

See section 8.1 for illustrated guide on to how to square up image



Ensuring projector is level in all 3 directions and leveling table is one way to do that (but being level is not crucial, projector and surface can be at same angle of unlevelness and still be square to each other. Keystone adjustments can be easier, but make it harder for image to be focussed across surface of projection, so better to square the image by tilting projector or table instead.

- **Adjust zoom until boxes measure accurately:**

- in Adobe by typing numbers down to 0.1% level of accuracy (computer only, see below for mobile) until 4 central 1" squares (or 2cm squares on metric tool) align with mat grid lines and all sides of rectangles measure correctly (or as close to accurate as possible).
- On mobiles we can't type a zoom, we can only adjust zoom with fingers. Tip #4 in Top Tips guide explains more about adjusting zoom/scale for patterns on mobile.

- We go into full screen mode to do zoom so we see as many full boxes as we can - see Key Tip in section 1.1 for how to do that in Adobe without zoom changing. **In Adobe, Control Y on Windows / Command Y on Mac allows us to access zoom to change it. Just press numbers and press enter do not use mouse to select preset zoom levels.**

- **Get a tape measure, and concentrate on adjusting zoom until largest box visible on your mat measures accurately. Smaller boxes will measure accurately automatically, once largest boxes are accurate.**

- **If any aspect ratio issues arise (squares being stretched into rectangles), adjust aspect ratio settings on projector and/or set computer to native resolution of projector.** See section [5.1 Aspect ratio problem/Squares stretched into rectangles](#) for troubleshooting aspect ratio issues.

- **Note for Apeman models:** they must be set to Panorama or Point-to-Point depending on the model.

Keep pressing down arrow until you see these options in the menu.

Don't worry about small boxes too much, they will align automatically when you align largest complete boxes that you can see on your mat with grid lines on your mat. Taking a tape measure to sides of largest boxes often makes it easier to know when you are accurate, rather than counting boxes on your mat.

Calibration doesn't have to be perfect. Total differences in measurements of largest boxes of $\frac{1}{8}$ " to $\frac{3}{8}$ " can still mean calibration is 99% accurate. See section [5.0 How much misalignment is OK?](#) for more info,

After you are calibrated you can start cutting!

- but scale/zoom always needs to be checked

- Read [Top Tips guide](#) for how to use your projector with patterns. On computer, we type our calibration zoom in each pattern we open, measuring the test square every time to ensure nothing has gone wrong. (Tip #5 in [Top Tips guide](#) explains how we ensure accurate scale on mobile).
- Check your pattern company files to see if they have layered A0 files (layers are essential to make it easier to see the lines to cut), or projector-specific pdf files. (Projector files have layout features that make it easier for projecting, including grain lines all in same direction.)

3.0 Additional Helpful Info and Tips

Projector setup and calibration can be intimidating, and this guide is packed with tips to help you find your way to get your projector mounted and calibrated so you can start projecting patterns.

Setup and Calibration is often more efficient and easier if you don't do all steps at once. Take breaks often, as our mind needs to rest during this brain workout!

To learn about which projector may work best for your needs, read the [Projector Types and Models Guide](#) - **most importantly, make sure your projector lists the *native resolution* (not “supported”) as at least 720p** - which is same as a resolution with a second number of 720 or higher (for example 1024x768, 1280x720 or 1280x800). **The *only* projectors with native resolution of less than 720p that have calibrated correctly are Apeman and Wowoto models so far.** They have special aspect ratio settings that allow their images not to be distorted.

Projector Menus and Options

- Get to know the **menu options** on your projector, read the table of contents of the manual and any relevant sections (google to download it if you don't have it).
- Get to know how to adjust **focus**
 - on most projectors the focus dial is by the lens.
- Get to know how to adjust **keystone** settings
 - Keystones settings are a way to get an image shape from being “trapezoidal” to rectangular with square 90 degree corners, which is needed for accurate calibration. Most often keystones are a dial by lens, but can be an option in menu instead.
 - Generally it is better to achieve an image with 90 degree corners through physical adjustments of tilting angle between mat and projector, but keystones are often much easier to adjust, then physical tilting adjustments. But keystones reduce image quality a bit, and can't give as fine control as tilting.

- Search for **aspect ratio options** in projector menu. On most projectors you won't need to change this setting, but if you run into calibration issues, you may need to cycle through these options. Sometimes you need to press the down arrow to see all options.

Mounting

- Connect device to projector before mounting, to make sure that is working.
- When deciding on location for projector, turn projector on, so you can see where image is casting to and adjust location.
- Mounting projector depends on your setup, and specific projector
- Most ceiling mounted projectors used in our group only have one mounting screw (Vivimage, Apeman and Bomaker models for instance), so search for that type of mount if that is the case for your projector.
- Ball joint mounts can be a bit too loose, add a piece of paper, or some sandpaper in the joint to stabilise it. Zip ties, large elastic bands, and cardstock can also be useful for adjusting projector tilt to the exact angle you need.
- The higher you mount it the larger the image size. Image size is also dependent on projector specs as explained in “What to look for in a projector” guide in Projectors for Sewing Announcements.

Connecting via cable

See our new [Guide to Ports and Plugs on Your Computer and Projector](#) for info on which port/cable will work best for your setup.

Connecting wirelessly

See section [4.5 Vivimage models \(including Acrojoy, Alvar, sunspark, etc.\) - also applies to most other wifi mini projectors like Yaber or Vankyo](#) and/or section [4.8 Chromecast device to make any projector wireless](#)

More help

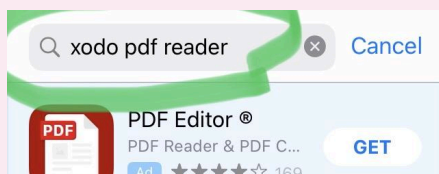
If there are questions you still have after going over info in this guide, you are welcome to post them anytime in [Projectors for Sewing](#).

If you want to see a calibration in action, you can go to the [Dailey Sews and Stuff](#), a youtube channel by Projectors for Sewing member, Branalyn Dailey, where calibration is demonstrated in [this video](#). Not all the steps in that video will apply to all projectors, but it gives a general idea of the process. As mentioned in the video, calibration is hardest the first time, and for most people will probably only need to be done once. If the projector is on a portable mount, many settings will remain the same, and there will be fairly minor calibration steps to do when setting up the projector again.

4.0 Projector model or computer/device specific info

4.1 Mobile devices (iPhones, iPads, Android mobile devices):

- Projecting from a phone/tablet/mobile device is possible, but currently there is no simple PDF reader app that allows us to type a zoom, so we have to finger zoom each pattern (with the exception of iPads, see below). It is best to use the methods in Tip #5 of <https://bit.ly/ProjectingTopTips> to set accurate scale when projecting from mobile.
- On iPads you can purchase Affinity Designer app, if iPad runs iOS 15 or later. Affinity Designer app does allow typable zoom and access to layers, so is best for projecting from iPad. It is a drawing program, so is also very helpful for pattern adjustments. Join this group for more info: [Affinity Designer for Pattern Design and Alteration Facebook group](#). First calibration is best to do from Xodo pdf reader like other mobile devices, just for simplicity of the interface.
- Connect mobile devices to projector either:
 - With HDMI cable for your device.
 - You can connect wirelessly if projector has on board wireless connectivity
 - You can connect wirelessly if you add a casting device like a Chromecast to the projector. For iOS devices, Chromecast connection needs a paid app to do screen sharing. See section [4.8 Chromecast device to make any projector wireless](#) for more info. For iOS devices, an older cheaper Apple TV connected to projector works very well.
- We use Xodo PDF Reader app on iOS and Android devices, as it is the only PDF Reader app that will allow us to access layers (but no typable zoom).



- For tips on using Xodo and mobile projecting, see info in Tip #5 the [Top Tips guide](#) linked in Announcements of Projectors for Sewing FB group.
- **Turn device to be in landscape mode to get largest image size** (won't work on home screen but will work in apps).
- Image size is affected by shape of device. Devices that are narrow in proportion to length such as new iPhones will have more limited height of projection (short side) than wider devices/tablets.
- Surface Pro is different than iOS and Android devices because it can run Windows apps, so you will be able to use Adobe Acrobat Reader and type a zoom.
- Chromebooks may or may not work depending on whether they can install apps like Xodo PDF reader, and if they have touchscreen or if you can get used to finger zooming on the trackpad.
- Follow section [2.0 Calibrating](#) to calibrate projector once you have connected mobile device and screen is mirrored. The steps about typing a zoom don't apply to mobile devices, but everything else does.

4.2 Macs

- If connecting to projector is not working, check security & privacy options (in Mac System Settings), scroll down to Screen Recording and click ON for your projector (or the Chromecast, if you are connecting that way).
- Also if having problems when connecting by HDMI, open Display panel in Mac System Preferences to make sure projector is seen by computer, this is where you can change projector to Mirroring mode if it's not already. If connecting by USB display to Epson UST, projector will not show up in Display panel, see section 4.7 for more info.
- Depending on age of Mac, there will be different cable or adaptors needed if connecting by cable to projector.
 - If Mac is older and has a small port with a lightning bolt symbol, that is a thunderbolt port, which is compatible with "mini display". To connect to HDMI on projector, a mini display-HDMI adaptor is needed, along with HDMI cable
 - If Mac is newer and has oval USB ports, those are USB C ports, and you can get a USB C multi port adaptor, which is useful for all kinds of devices. It will have HDMI as one of the ports. Or you can get USB C-HDMI adaptor for HDMI cable, or get a USB C to HDMI cable.

- If connecting to Epson UST, see section 5.7 where we recommend USB A-B cable because it is cheaper, and occasionally adaptors needed for a Mac create aspect ratio distortion.

4.3 Apemans:

- Press down arrow to see all aspect ratio options
- LC 350, change aspect ratio setting to “Panorama”
- Lc 550, change aspect ratio setting to “Point to Point”
- You need to be connected via HDMI (or add a chromecast) to see these options.

4.4 Bomaker:

Some models of this projector brand create its own wifi network, does not connect to your own wifi network. This means you have to disconnect from your and connect to the projector, so on a computer would mean you can't be connected to your wifi internet and the projector at same time.

Most often with this projector you need to change computer display resolution to native resolution of projector to solve aspect ratio issues (1280x720).

4.5 Connecting wirelessly to mini projectors (e.g. Vivimage, Acrojoy, Alvar, sunspark, Yaber Vankyo, Yoton, etc.)

For wireless connections in mini projectors that have that option, follow instructions in manual to connect the projector to your home wifi network (make sure it is same network as you will be using with your device/computer, not a different band or variation on the network name. Some models will not work on 5ghz band of a router, unless they were sold as “5G”.

The projector instructions will only explain how to connect to mobile devices, but the wireless connection works with computers too. For Windows, select “Miracast” or “Android” or similar button. For Macs, select “iSCast” or “iOS Connect” or similar button.

Windows 10/11 setup: Press Miracast/android button on projector remote or menu, then press Windows Key and K (think of K for “Cast”). Then in the panel that comes up, select the projector (it may have name such as “Z-Cast”).

In some cases, but seems to be less common, Android/Miracast connections may “shrink” image after connecting. If so go in computer display settings and change resolution to 1280x720, or whatever native resolution of the projector is and reconnect to the projector. Image size should then stay in same shape/size. If that doesn't work, adding a casting device like a Chromecast, or connecting via HDMI cable will solve the “shrinking image” problem.

Macs setup: Press iSCast/iOS Connect button on projector remote or in menu, then look in Mac menu bar for AirPlay (TV icon), click and select the projector from the list (might have a name like Z-cast).

4.6 Any second hand/used projector

- Look for “**Reset**” option in projector menu to return it to factory settings which will make calibration easier.

4.7 Epsos USTs

- “**Reset**” settings in the last menu item (access menu with remote, or buttons on projector).
- Adjust focus with lever behind air intake grill door (there’s also a filter there that should be vacuumed regularly).
- Adjust Image Shift, Zoom, and Projection>Front Upside Down settings in projector menu to get image to best location and size. You may also want to put projector on small riser on table or nearby shelf to raise projector slight off table to increase image size until is is best size for your needs/table. Raise projector with your hands to see which location will work best to get image size and location you want.
- If you want a wireless connection to projector, you need to add a casting device like a Chromecast to projecor’s HDMI port, steps in [4.8 Chromecast device to make any projector wireless](#). The Epson “wireless module” does not work for our needs for easy screen sharing.
- Connecting by HDMI cable is simplest. On Windows press Windows key and P and select Duplicate. On a Mac this step should happen automatically, but you can also set it manually with System Settings>Display>Epson>Mirror.
- Press Source button on projector or remote and select HDMI if needed. If screen is blue look at bottom left corner and see what source it is looking for signal.
- On a Mac, USB-c (oval port) to HDMI cable adaptor s will work. HDMI to USB-b (Rectangle ports will not), instead use Mini display to HDMI cable or adaptor, and plug into thunderbolt port on Mac.

Only if manually calibrating - the following steps not applicable if using Pattern Projector or Project & Cut:

- If connected via HDMI, you can cycle through aspect ratio options (under Signal in menu) if aspect ratio issues crop up. Most commonly, you'll also need to change the display resolution on computer to native resolution of projector (1024x768 for some, 1280x800 for other models).
- Occasionally HDMI connections seem to create unsolvable aspect ratio issues on the Epsoms (especially on a Mac which can be due to faulty adaptors.)



- The easiest and seemingly most reliable connection method for a computer to an Epson UST is USB Display, which uses a USB A/B cable like for a printer. Square end goes in Epson UST (all models), and you have to install a driver on your computer. USB display will not work with mobile devices.

- USB Display Driver for Windows: <https://epson.com/Support/wa00790a>
- USB Display Driver for Mac: <https://epson.com/Support/wa00790c> (see more

below)

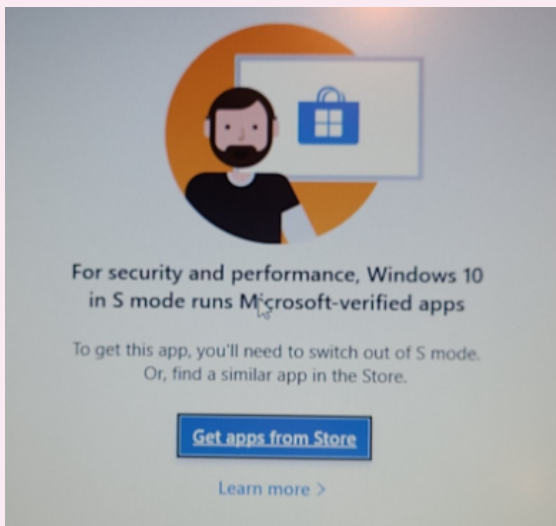
- For Macs with MacOS 10.14 or 10.15, MacOS 11 Big Sur, and newer, the above link has may not be updated yet for these newer Mac OS versions - instead type your projector model in this Epson support page linked below, which will bring you to your specific device support page. Then under “Downloads” adjust the MacOS version if needed, and click Utilities and then the blue Download button next to “USB Display Installer”. <https://epson.com/Support/sl/s>

- Once driver is installed (not just downloaded) on computer and USB A-B cable is plugged into computer and projector, press Source button on projector or remote, and Choose USB Display. ***Important step for all Epson models ending in “i”***: USB Display option will not be active in most cases. To fix that, go in Epson menu and under Extended>USB, select “USB Display/Easy Interactive”. Then press Source button and select USB Display.
- Projectors for Sewing group member Branalyn Dailey has a video on setting up and calibrating an Epson projector:
<https://www.youtube.com/watch?v=gMtDHngplaY>

4.8 Chromecast device to make any projector wireless

- Any projector can be made wireless by adding a Chromecast device (any version) to the projector HDMI port (or with a HDMI-VGA adaptor if it only has VGA). The Chromecast gets power by plugging into the USB port of the projector.
- You set up the chromecast on your home network via Google Home app on a mobile device (can't be done on a computer).
- Then you screen mirror your computer to the projector, by opening Chrome browser, and using the “Cast” option in the menu. In new version of Chrome, “Cast” is located under “Save & Share” menu item (scroll all the way down to find it).
- In the Cast menu, under “Sources” change from Cast Tab to Cast Screen (older versions will have “Cast Desktop”). Then select your Chromecast under Devices. This order is very important. You can't switch from casting tab to casting desktop while it is casting. You need to activate device after choosing Cast Desktop.
- When “Casting Screen”, you have to accept the confirmation message to allow screen mirroring. Occasionally, that popup window is blocked – check near your address bar to allow that popup.

- Using a chromecast works well with Windows and Mac computers, or with Android devices. With iPads or iPhones, you need a paid app to allow screen mirroring. For these iOS devices, only Apple TV added to projector can mirror screen wirelessly without a separate paid app. Older, much cheaper, versions of Apple TV will work for our needs, and eBay and other online or local second hand marketplaces are good places to find these older Apple TV devices cheaply.
- Other casting devices may work too - Apple TV definitely with Macs and iOS devices, Firestick potentially with some computers/devices, Miracast devices like Anycast may potentially work. But any casting device has to be physically attached to projector.
- “Wifi dongles” do not work. That includes the Wifi module for Epson projectors. It does not allow for easy screen sharing that we need.



4.9 Windows S mode

Windows S is a high security mode, mostly used for children, grandparents, and some businesses. It doesn't allow adding apps from websites. For projecting, we need the free version of Adobe Acrobat Reader DC because it can access layers and has a zoom level down to 0.1% level of accuracy. We have not found a PDF app in Windows Store that has those critical functions. This version of Adobe that we need is only available from their website, not in Microsoft App Store. Download from:

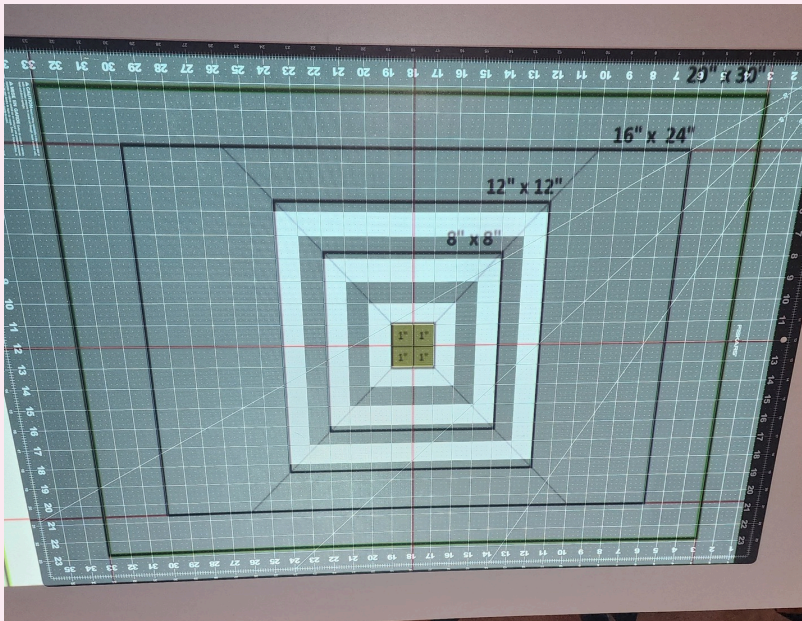
get.adobe.com/reader

The solution for this dilemma with Windows S mode, is to get the computer out of S mode, and to be a regular Windows computer. It is simple to get out of Windows S mode, but you can't go back to it. So you will lose the protection of Windows S, but your computer will be more functional. Regular Windows still has good security protections.

Instructions from Microsoft Support to get out of Windows S mode: [Switching out of S mode in Windows](#)

Once you are out of Windows S mode then you will be able to install the version of Adobe from the link above.

5.0 Calibration Troubleshooting Examples



5.1 Aspect ratio problem/Squares stretched into rectangles

- Vertical lines/measurements match but horizontal lines/measurements don't match, or the opposite. If calibration is very frustrating, it is most often due to this problem

Can also be seen by looking at diagonals in central grid. Projected diagonals that drift away from corners of boxes on mat mean that the squares are slightly rectangular due to aspect ratio problem.

- This is most common with projectors that have less than 720p native resolution. Except for the Apeman and Wowoto models, all

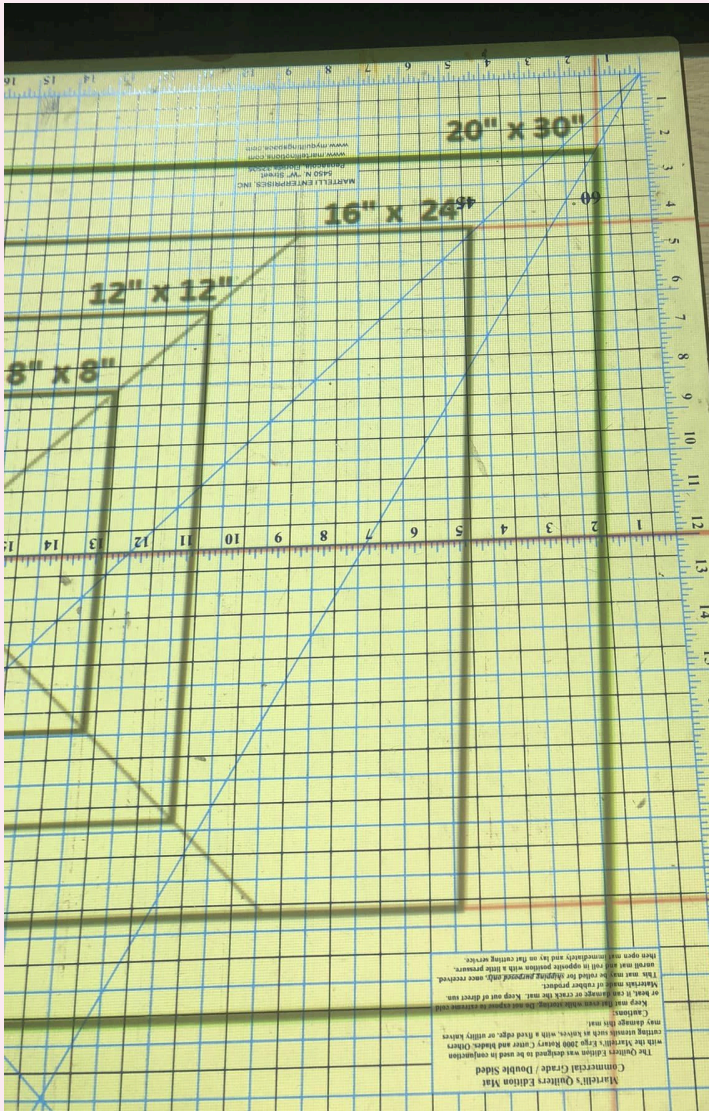
projectors that have been tested in the Projectors for Sewing group with less than 720p native resolution have not

been able to calibrate correctly due to aspect ratio issues. 720p native projectors are almost always able to adjusted to solve the aspect ratio problem.

- This misalignment is due to the aspect ratio settings and the projector is stretching the grid squares into rectangles.
- On UST projectors, quite often projector tilt issues or uneven surface can look like aspect ratio problems, so fix those issues first and to boxes have 90 degree corners. **Also very important with USTs to reset projector settings (last item in projector menu). Previous user settings can interfere and create aspect ratio issues.**
- This problem can occur with computers, but usually not on mobile devices. The displays on mobile devices don't get scaled in the same ways as when a computer is connected to the projector.
- **First thing to check is the settings on the projector and look for aspect ratio options in the menu.**
 - On some projectors, you have to press the down arrow a few times to see more options that don't appear right away. On the Apeman projectors you have to be connected by HDMI or Chromecast to see all options.
 - On Epson projectors, aspect ratio menu is not available if connected by USB display cable,
 - Look for aspect ratio options such as Panorama, Point-to-Point, Native, or Full as they are often most successful (when available). You may have to cycle through all aspect ratio options to see which works best.
 - 16:9 is the setting that usually works best on projectors with 1280x720 native resolution like the Vivimage
 - 4:3 will work better with projectors like some Epson models that have 1024x768 native resolution.
- **If projector aspect ratio settings don't solve this calibration issue, change the computer's resolution settings to native resolution of projector.** Check your projectors manual to find the native resolution of the projector. Here are the native resolutions of popular projectors:
 - Vivimage Explore 2 and Apeman LC550: 1280x720

- Epsos USTs with a model number ending in 0 without W (460, 470, 480, 580, etc.): 1024x768
- Epson USTs with a model number ending with W or Wi (450Wi, 475W, 585W for example, etc.): 1280x800
- Open your computer's display settings and set it to native resolution of projector if available.
 - On Windows 10, type "resolution" in windows search bar to access setting
 - On Mac, go in System Preferences>Display and hold down Option key when clicking "Scaled" so full list of resolutions appears.
 - If your computer does have a resolution option the same as both numbers in your projector resolution, try resolutions where one of the numbers are the same.
- **After changing to native resolution, cycle through aspect ratio options on projector again, if necessary.**
- **Alternatively, in computer display settings you can change to Extended mode instead of Duplicate/Mirroring** (computers connected by HDMI/VGA only). This means projector and computer screen will share one large desktop with computer on left and projector on right. You will drag Adobe window to right side of desktop so it appears on projector. Getting used to mouse moving between both screens takes a few minutes to get used to.
 - Once you have changed to extended mode you may need to cycle through aspect ratio settings on projector again.
- Another cause of aspect ratio distortion can be a faulty HDMI cable. If connected to a Mac via a mini-display / thunderbolt adaptor, the adaptor can be faulty. You can try changing to different cable, or different connection type to test if that fixes the problem.

5.2 Sides are straight lines, but some are drifting diagonally.



- To fix this, image needs to be squared up using tilting/physical adjustments or keystone adjustments.
- In this photo, top of boxes (at bottom of photo) measure more than bottom of boxes because we see lines to diagonal towards bottom of boxes. Which means distance between top of projection and projector is too long
 - Tilt top side of table towards projector (sometimes a few folded business cards under table legs is all that is needed).
 - Or tilt projector to be *slightly closer to top of surface it is projecting too. Keystone adjustments can be done instead if it's easier (image quality may decrease a bit).
 - On Epson ultra throws, correction is done by tilting projector, in this case tilt projector away from table, so that bottom of boxes becomes longer.
- Tilting helps when projected lines are noticeably drifting diagonal instead of fully parallel with mat grid lines.
 - If projected lines are bowed/not fully straight see 6.2
 - If lines are parallel but not on top of each other, adjust zoom.

It is always preferable to make physical tilting adjustments over projector keystone settings. Keystone settings make the image more blurry. Zoom in the picture for the steps for each shape. The steps are described for a ceiling

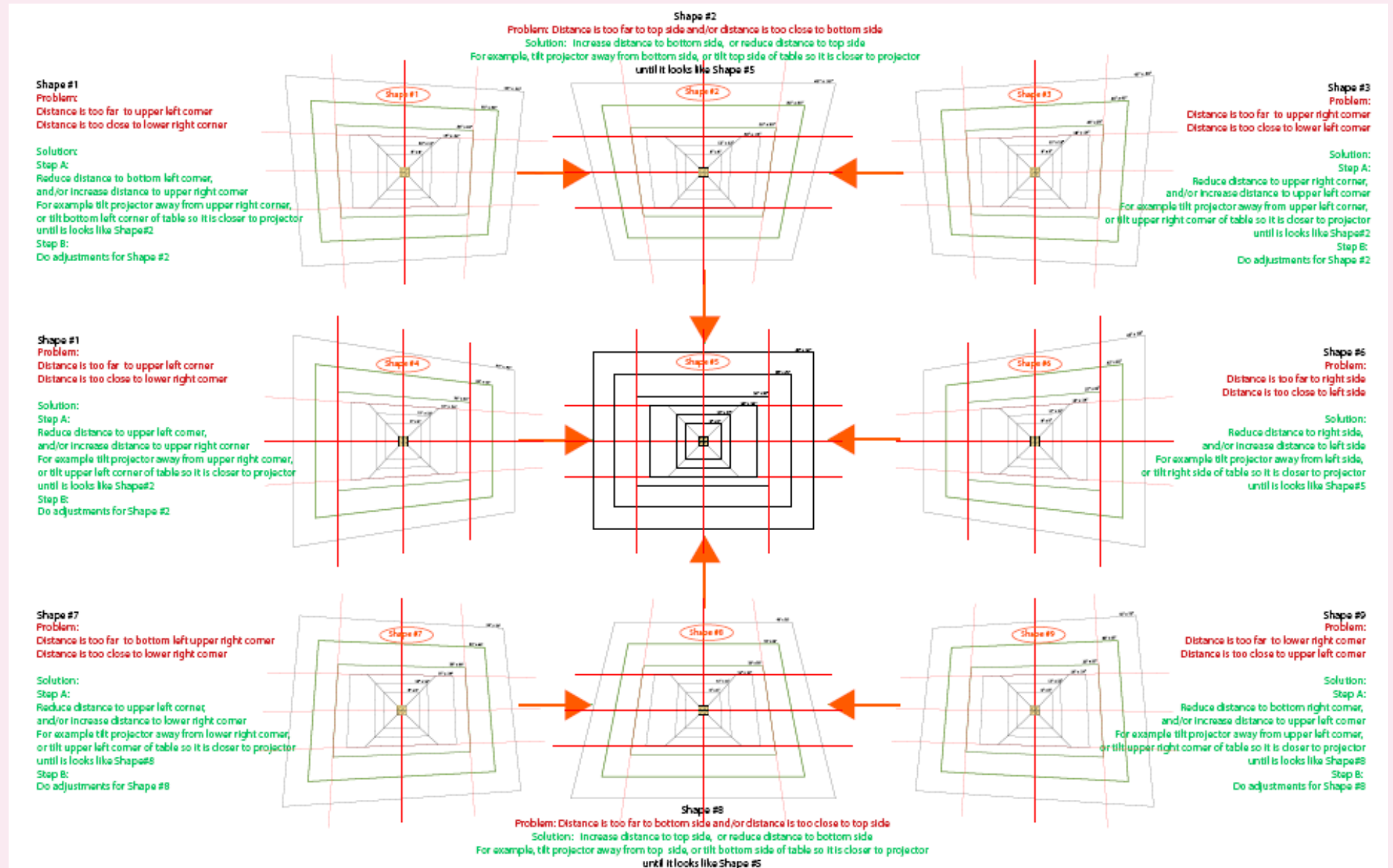
based projector. Compare the image shape your calibration looks like to the shapes in the illustration and follow the steps for that shape.

UST projectors also can be tilted to make image square, but tilt adjustments are a bit different since it is at 90 degrees to the. A second illustration will be added for USTs. Until then, use these steps to square up UST projector:

- Just one or more pieces of folded cardstock in front and/or back of mat will help stabilize it to the exact angle you need.
- If bottom sides of rectangles measures less than top sides, then projector needs to be tilted backwards, so put cardstock under front of projector.
- If bottom sides of rectangles measures more than top sides, then projector needs to be tilted forwards, so put cardstock under back of projector.
- If one side measures less than other side, then put cardstock under that side of projector.
- Sometimes it is just one corner of projection that is out of alignment - put cardstock under equivalent corner of projector.

Diagonal lines/Image is not square illustration by Dan Oen

To see better quality image of this click here: <https://bit.ly/AdjustingKeystoneSteps>

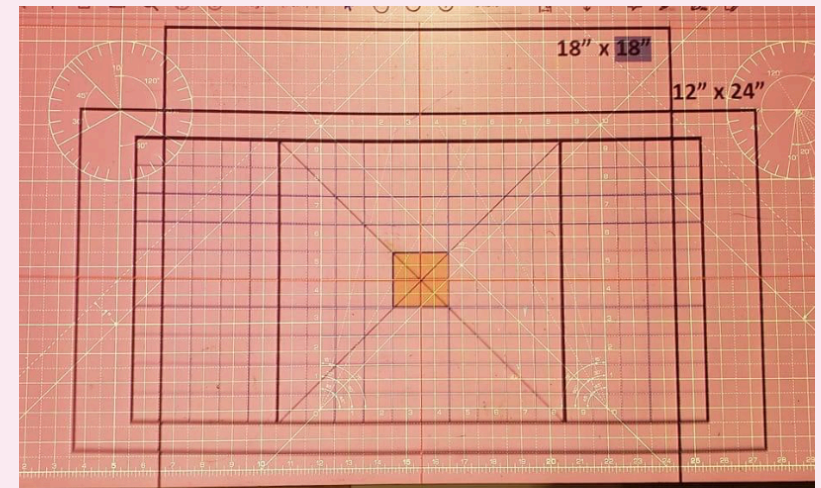
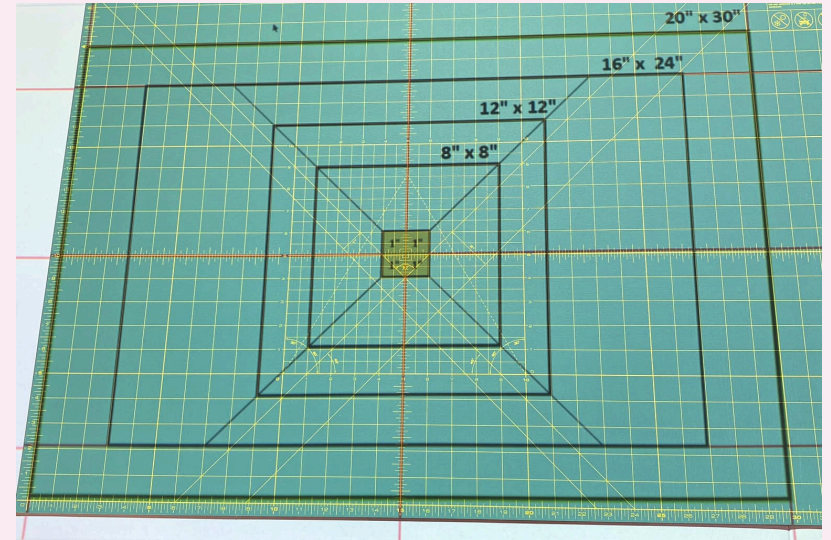


5.3 Lines not fully straight, slight curving/bowing in some lines

Almost all warping and bowing of lines in projection is due to surface not being flat enough.

Keep eye on red central axes lines - if they are not straight on top of the mat grid lines it very likely means surface is not fully flat. Some slight bowing at end of long horizontal axes (after about 20" from centre) is OK, that won't make noticeable difference in sewing, unless very tailored long inseam pants.

- If it's minor, then just avoid doing most cutting in bowed area.
- If table has seam, look to make table more even on both sides of seam.
- If it's significant, add a piece of drywall, plywood, or MDF under mat will eliminate unevenness. Or if mat is warped, replace mat.
- If unevenness is due to a low spot on table, putting cardstock under mat, to support mat to be higher in that area will improve calibration.



5.4 Accuracy of measurements not as good on larger boxes

Grid lines match in central area, but larger boxes are not aligning.

- Zoom is either slightly too high or slightly too low. Keep adjusting until the alignment is closer (using 0.1% increments if using computer).
- If both slightly higher and slightly lower zoom settings give worse alignment, then your zoom setting is best one.
- Measuring point is the centre of the projected lines, so all projected lines should be on top of mat grid lines.
- If you have a very large image size, it is OK if largest boxes don't align completely. Being 1/8" off on both sides of a 30" box is still over 99% accurate.

5.5 Multiple issues

If you have multiple issues affecting calibration, start with easiest:

- Align Central Axes
- Adjust zoom in Adobe until it largest box on mat is as accurate as possible in increments of 0.1% (if aspect ratio issue, don't spend too much time on this).
- Check if you have aspect ratio issue: Looking at the projectors diagonals, we see they go through the corners of the grid squares on the mat and there is no noticeable "drift" of the diagonals. This means aspect ratio is correct. Also can be checked by measuring horizontal and vertical sides of central squares - they should be very similar in measurement. If you do have aspect ratio issue, go right to solving
- When opposite corners are out of alignment, start by fixing one corner, then adjust zoom and reassess to see if image is squared up, or if a second corner also needs adjusting.

5.5 I still have problems, what can I do?

You are welcome to post your calibration questions in the Projectors for Sewing FB group.

When posting a calibration question please include:

- Which projector you have
- Which device you are projecting from – for example Pad, Chromebook, Windows 8 PC, Macbook, etc.
- How you are connected: HDMI, wireless, etc.
- Issue you are having and steps you took/are stuck on
- **A picture of your entire cutting mat with the projected grid lines on top.** (just one pic with whole mat is best, we can zoom in)
 - **Please take the picture with the mat in landscape orientation.**

If you would like to pay for personal calibration help via video, sign up for a Calibration Class or for One-on-One calibration support with Missy Pore, the Founder of the Projectors for Sewing group:

One-on-One Support - Missy's Projector Calibration Help: bit.ly/MPChelp

6.0 How much misalignment is OK?

If you have to squint or really search to see the misalignment, you are good, as calibration does *not* have to be *perfect*.

A little bit of misalignment/diagonal lines at edges is OK. Being off by $\frac{1}{8}$ (~0.25cm)" at edges only is **not** like being $\frac{1}{8}$ " off a test square when printing, due to the much larger distances in a projected image.

If the 20"x30" box on the calibration tool is off by $\frac{1}{4}$ " in total length, that is over 99% accurate. (On the metric mat, being off by 0.5cm on the 40cmx60cm box is over 99% accurate).

- (If you're interested here's how accuracy is calculated: $\frac{1}{4}$ " is the inaccuracy accumulated over 30 inches, $\frac{1}{4}$ " = 0.25" divide that by 30" = 0.0083 or 0.83% inaccuracy, which means accuracy is 99.2%, a very good level of accuracy.)

Lines being off by $\frac{3}{4}$ " on a 30" length is more significant – that would be about 97.5% level of accuracy. If possible make small physical adjustments or use keystones or adjust zoom to get lines to match more closely.

7.0 What next?

If you've successfully calibrated, have a little celebration for all your hard work. It's all paid off and you can now use your projector!

Read the [Top Tips Guide](#) for how to use your calibration zoom in patterns, rotate pattern files, increase the visibility of lines, and other helpful tips to get the best use of your projector.

If you're feeling grateful (but maybe slightly overwhelmed) for all this info being compiled to make it easier to start your projector sewing journey, consider paying it forward to a local cause important to you. **Making a donation to your local United Way/Centraide if there is one in your community, is a great way to support important community development and direct support to those who need it most in your community.**