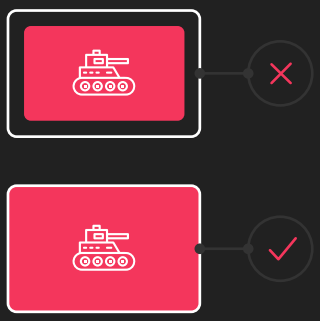
Distortion Grid — How To

01

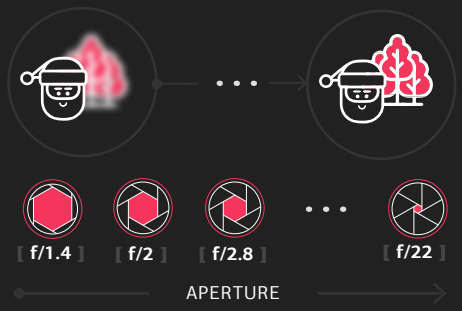
Choose a format that uses the maximum sensor area of your camera (on the professional speech this is called “Open Gate”)

In some cases, we can leave the planned shooting format, but in this case we will not be prepared for the situation when the shooting process will select a format that uses a larger area of the camera sensor for which Distortion Grid is not captured



02

Close the aperture to the maximum value

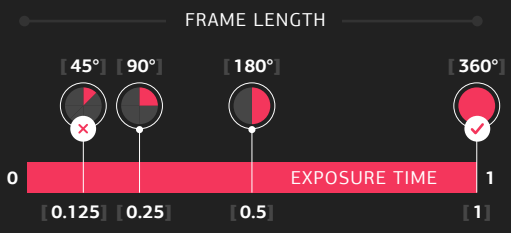


03

Set fps to minimum

04

Set shutter to 360 degree



05

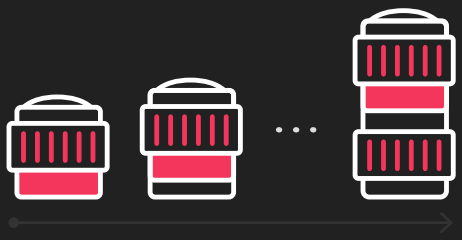
Raise ISO if picture too dark

Distortion Grid — How To

06

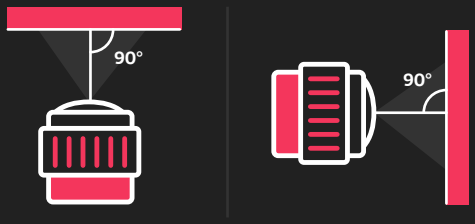
Install the lens with a minimum focal length

If we use a zoom lens, then set it to the minimum amount



07

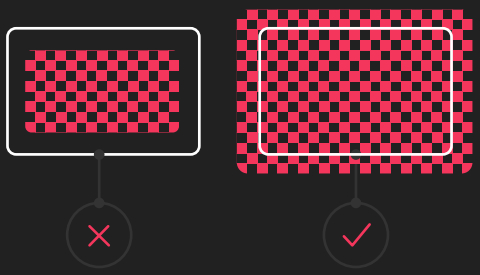
Set the camera so that its optical axis is approximately perpendicular to the surface of the Distortion Grid



08

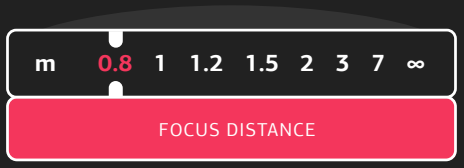
After that we move the camera so that the Distortion Grid completely fills the entire frame

It is important that the edges of the frame be completely covered by the grid's chess pattern. No need to try to fit the whole grid in the frame - let it go beyond it



09

After that we set the minimum focus distance on the lens



10

Write the following data:

- camera model
- frame format (shooting resolution)
- focal length
- focus distance

Focal Length	Focus distance	camera model	format

For your convenience, we `ve made special magnetic stickers for our Distortion Grids

Distortion Grid — How To

11

Then shoot

One second is enough, since we need one static frame

12

After that change the focus distance

We pick the step size based on our needs: the smaller the step, the more accurate the lens distortion profile will be, but it will take much more time.
For convenience, distance marks already applied to the lens can be used as a step size

13

Repeat steps 10-12 until we reach the value of the focusing distance “infinity” (it also needs to be captured)

14

After we have reached the value of the focusing distance "infinity" we install the next lens and repeat steps 9-13

15

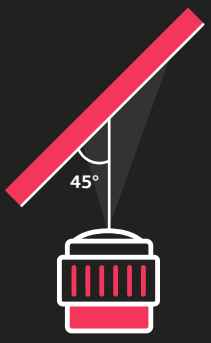
If we use zoom lenses, then the algorithm of actions is similar to shooting Distortion Grid for prime lenses, but instead of changing the lens, we twist the focal length adjustment ring and repeat steps 9-13

We pick the focal length step based on our needs

16

After all the lenses are recorded, we can rotate the distortion grid at an angle of about 45 degrees to the optical axis of the camera and do points 8-14

This type of shooting allows you to get more accurate distortion values (if you use both types of grids at the same time in 3DEqualizer), and it also allows you to calculate focal length data. This is especially cool when we use zoom lenses



Explanations, additions and comments:

- We close the aperture to increase the depth of field. This helps us to keep the grid distortion in focus at any values of the focus distance

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- Shooting a Distortion Grid for different focus distances is important because when adjusting the focus ring, there is an effect of “breathing” which also affects on distortion

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- When shooting for CG, it is advisable to avoid zoom lenses, because it is almost impossible to determine the exact values of the focal length. Or you need to use lenses with the LDS system (Lens Data System), which writes these values into the metadata www.arri.com/camera/alexa/learn/lens_data_system/

- Also, to obtain a high-quality result, a sufficient amount of filling light is needed so that there are no highlights in certain parts of the image - this will help to avoid manual adjustment at the stage of calculating the distortion in your 3D tracking program

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- For the most detailed information about your camera (active sensor area with a selected shooting format, etc.), we recommend using www.vfxcamdb.com because often even the manufacturer’s website does not have the necessary information and sensor specifications

LINKS

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