



THE Ultimate Guide to 3D photos and 3D videos

Now Everybody Can Make Them

Bonus: 2D to 3D conversion

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Welcome to the World of 3D!

3D photos are more than 100 years old and 3D films are just a few years younger. But only now it is at last possible – and even easy – to make your own 3D photos and 3D videos at home. You can have great 3D photos of your holidays, of your family, of your life. And there is a big difference between ordinary 2D photos and 3D ones – the perception of depth may be literally stunning. For you, for your family and for your friends.

This is the reason why so many people make their own 3D photos today – and some of them even 3D videos – not as a professional work, but just like a personal memory of things that happened to them and to all the people they love. Yeas, it is so easy! And the results can be so great! There is no reason not to start with 3D photography today. We would like to help you to create the best 3D photos and 3D videos possible.

Yours

Bispiral team

How 3D photos work

When you make a 3D picture (sometime the term „stereogram“ is used) you use one important feature of human eyes – our eyes, the left one and the right one, see a slightly different picture. The difference depends on the distance of every object on the picture from your eyes. We won't offer a long explanation here - let's just make a short experiment instead:

- 1) Take anything to your hand - for example a pen.
- 2) Well, you have a pen in your hand. Point it up. Give it in front of your eyes to a distance to see it well. Now take a look at any object behind the pen – for example at a computer monitor or at a cup of tea on your desk.
- 3) Close your left eye and shift the pen to place it in a position which you can easily remember. For example before an edge of the monitor. And now open your left eye and close the right one. Do you see the difference? If you did the experiment carefully, you could see the pen has shifted to the right (but it hasn't moved really). No success? Try it again.

From this experiment you can see the left eye sees things, which are in front (for example in front of the edge of the monitor), a little bit more to the right than the right eye. And the things at the back a little bit more to the left (you can try to position the pen behind the edge of the monitor).

How to use it to create a 3D photo? If you take one photo from the point of view of the left eye and one photo for the right eye then the only thing you have to do for 3D is - to deliver every photo to it's eye. How? You can merge the photos in a special way and then watch them through a special glasses (because without the glasses every eye sees the same).

Blue-Red glasses

The most affordable glasses you can use for watching stereograms (3D pictures) are glasses with red-blue (red-cyan) slides. You can buy them in many e-shops. How the glasses work?

If you give the glasses before your eyes (red slide before the left eye, blue slide before the right one) you

can see this: left eye sees the red world and the right eye the blue world. But it isn't all. There is one more important thing. If something is red (for example a red cup on a white desk) then the left eye almost can't see it (it sees the red cup on the red desk), right eye sees it as dark. Similarly the right eye doesn't see the blue (blue-green) things. If the background isn't white then the situation changes - but the basic principle is the same - different eyes see different things.

And that's the trick. If you take your photos for the left and right eye and use only their red or blue (bluegreen) part and then mix it then you get the stereogram (3D photo). When you use the glasses every eye sees only it's own part of the 3D picture. But how to do this?

Software – program – application

To do a stereogram from the left and right photos you should use an appropriate software (computer program). There are a few of them – and we recommend the one that is available for a very affordable price at 3DJournal.com. Why this one? It is very easy to use and it offers a lot of useful features. There is also a limited FREE version of the software

available there. More about the software you can read further in this book.

One more thing

The 3D pictures which are visible with red-blue glasses are called Anaglyphs. There are some other technologies to make and watch stereograms - for example polarisation or LCD shutters. But only anaglyph is so cheap and easy to make at home.

3D systems

There is lot of different ways how to create and watch 3D images. Remember - if an image should be viewed as 3D then the right eye has to get it's own picture and the left eye it's own. These two pictures should slightly differ - and in the difference there is encoded the spatial information.

The question is, how to deliver the right picture to the right eye. There are 2 basic ways: every eye can have it's own image - for example on it's own LCD display; or both eyes have one common picture but the right one sees different part of it then the left one - for example because you use a special glasses and the right eye sees only red colors and the left one only blue and green ones.

Stereoscopic pair

The simplest method is to place the 2 images beside each other. It's really easy - just place one image to the left and one to the right in your favorite graphical editor. But to watch it in 3D isn't very easy - it's

necessary to make your eyes to look in a far distance but to focus on the picture. The pictures mustn't be too big - if they are it's impossible to see them in 3D (or you can't be near to them).

There are some instruments to help people to watch stereoscopic pairs - glasses or special stereoscopes. One of this kind of interesting products is PokeScope.

Similar method to stereoscopic pair is cross-stereoscopic pair. The pictures are one beside the other, but the left one is on the right side and the right one is on the left side. To watch them in 3D you should put a finger between your eyes and then move it to the screen - between the right and left picture.

Two in one

The left and right pictures can be in one picture as well. But then it's necessary to separate one part of it for the left eye and the second part for the right one. It can be done in many ways - one way is used in hologram, a different way in 3D display.

Maybe you can remember „dotted“ 3D pictures which

were popular a few years ago. The spatial information was coded in slight vertical shift of a texture which was repeated many times in the whole picture. You could watch the 3D picture here quite simply - you have only to be able to focus your eyes „behind“ the picture. The 3D objects can't have it's own colors there but use the colors of the texture.

Another way of creating and watching of 3D pictures is anaglyph - a method which we will mostly use in this book. Every eye gets only it's own colors here - and in these colors (exactly - in the horizontal shift of the red and cyan/blue/green part) is encoded the spatial information.

A very good method is polarisation: Light is formed by electromagnetic waves which - in standard circumstances - oscilate in all directions. If you send to one eye only vertical waves (waves which oscilate only in vertical direction) and to the second one the horizontal waves and then use polarisation glasses, which let go the right waves to the right eye - you can see a 3D picture. Polarisatin can't be used with a standard computer monitor, but it is used in iMax

cinemas and by passive 3D TVs.

Sometimes you can see other interesting methods - for example glasses which slightly horizontally shift different colors - and then are for example red objects in the front and blue objects far away.

Quite popular are LCD shutter glasses. They can be used for PC games and for active 3D TVs as well. These glasses quickly open and close their shutters for the right and left eye - when the left eye can see the screen shows the left picture, when the right eye is „open“ then the screen shows the right picture. It's done very quickly - 100 times per second is minimum. But there is a problem - to use these glasses you need a good monitor which can show pictures with this frequency.

Sometimes - somewhere - you can see other ways of showing 3D pictures. 3D helmets, 3D glasses with 2 color LCDs, 2 monitors separated by a thin wall, 2 tilted mirrors or special 3D displays. We will see what the future would bring.

You can make 3D photos with any camera

Maybe you can not believe it is even possible. But you should. It's possible and it is very easy to make wonderful 3D photos with almost every camera, even the very cheap and simple one. It is great to have a professional equipment for making professional 3D pictures, but you are really able to make good 3D photos by an ordinary camera or camcorder. How to do it? We will tell you right now.

First steps are the same as by taking standard flat photos. You have to choose (or create) the right scene. To get 3D photo (stereogram) it's necessary to take two pictures - one from the position of your 'left eye' and the second from the position of your 'right eye'. It's easy. Just take a snap and then shift the camera a few inches to the right (or to the left) and take the second snap. You can use a tripod, but it can be done without it as well.

At the time of taking first and second picture the

camera should be in the same height. You should not tilt the camera in the time between taking these two snaps - for example in the direction to the ground or to the sky (or in the way that the scene is sloped to the right or to the left), because it would be difficult to make a good 3D picture later.

The scene

Preparing or selection of the scene is a little bit more complicated in 3D photography than it is in the case of normal 2D photos. To emphasize the 3D effect we recommend to select a scene, where are objects of different distance from the camera. If you, for example, take a picture of mountains which are far away, it's good idea to select a scene, where there is a tree or a big stone in the foreground. The tree or the stone then emphasizes the 3D effect.

The situation is simpler in case you take a picture of a room. There you can usually find some things which are closer and some in longer distance. For example a birthday cake on the table in front of the group of children.

When we are talking about children - there is one more important thing you shouldn't forget. The scene can't change between taking the two pictures (the left one and the right one). If it changes then the two pictures don't show the same scene and creating of 3D photo would be impossible. It could be easy to manage in many cases - people are used to be still when photographed and they can stay still two or three seconds longer. But it could be a problem for example with animals. In these cases you will need a special stereocamera or two cameras.

Taking snapshots

After preparing the scene you can take the pictures. If you take a photo of a „standard scene“, you should shift the camera (between the first and second snap) for about 2.5 - 3 inches (5 – 7,5 cm) - it's approximately the distance of human eyes. If you take picture of objects which are in longer distance from the camera, you can shift the camera more, in the case of very near object you should use shorter distance.

The easiest ways to make a good 3D photos are these:

A) Without view-finder:

- 1) Select a good scene.
- 2) Straddle to be stable. Take a first picture.
- 3) Don't move your body - only the camera - by 2.5 - 3 inches (5 – 7,5 cm) to the right.
- 4) Take a second snap.

B) With view-finder:

- 1) Select a good scene and then remember one point on the scene (a stone, a man, a tree). Good idea is to 'attach' it to a sign in the finder - for example to the cross in the center. Some cameras have special signs in the finder - the time, the distance etc. You can use one of them.
- 2) Straddle to be stable. Take a first picture.
- 3) Don't move your body - only the camera - by 2.5 - 3 inches (5 – 7,5 cm) to the right.
- 4) Check the position of the selected point (the stone,

the man, the tree) - it should be in the same height as before. Take a second snap.

One super hint

If you prefer to take 3D photos from hand anywhere/anytime then we have an advice for you. We have a very good experience with the procedure described on next lines.

1) Set your camera to take a serie of photos (3, 4 or 5). Aim the lens of your camera to the scene and switch on display. Now you can have your camera about 10 to 15 inches (25 -35 cm) from your eyes - and it's good because it diminishes the risk of distortion between the left and right images.

2) Press trigger and slowly shift your camera to the right. Now you have a serie of photos - and on every photo is the scene a little bit more shifted to the left. One of them is usually perfect.

This procedure is very reliable in many conditions. Only when you are on a low light scene you should not use it as the photos would be blurred.

Create a 3D photo

OK, you have the photos and now create the 3D photo. Transfer your photos to your computer and start the program 3DJournal (from www.3DJournal.com). It's easy to use. Just push the buttons at the right edge of the window of 3DJournal - the first button, the second button, the third button...

First button loads the left photo, second one loads the right photo. Third button makes the 3D picture. You should see mixed the original snaps and some red and blue 'ghosts'. Look at it using your 3D glasses. Isn't it perfect? No problem. Let's make a few corrections.

Because of possible distortions due to taking left and right photos by an usual camera without a tripod there are functions to the 3DJournal software, which are able to correct most of the problems. You can use arrows to the up, down, left and right to shift one of the images, you can rotate it to get the best possible 3D picture. You can also make it black-and-white. And then... then save it to the disk. Detailed information about how to use the 3DJournal software you can later in this book.

Tips for making the best 3D photos

What are the rules which can help you to make the best 3D photos possible? Our first rule is about the distance between two cameras (for the left and the right photo; if you use only one camera then it's about the shift between it's left and right position).

We've said this distance should be around 7 centimeters (2.5 inches). But the precise rule is this: use the distance equal to $1/30$ of the nearest object on the photo. If - for example - the nearest object is 2 meters from the camera and all the other objects are behind it, the shift between the left and right camera should be $2 \text{ meters} / 30 = 200 \text{ centimeters} / 30 = 6,66 \text{ centimeters}$ – or 2.62 inches.

This shift isn't an accident - human eyes can comfortably focus to objects (on one scene) from 2 meters to infinity - for nearer objects they have to refocus. We want to make a good visible 3D photo (stereophoto) - our eye shouldn't refocus between objects on this photo. The nearest object should be no nearer than 2 meters – and we expect eye distance

around 6,66 cm (2.62 inches; an international standard for stereopictures is 63,5 mm).

(And one more thing – this rule of $1/30$ is good for a 35mm film and a focal length of 35 mm. For bigger focal length (zoom - the scene is nearer) it's necessary to slightly change the rule – for example for focal length 70 (2×35) is the rule not $1/30$ but $1/(30 \times 2) = 1/60$. If you don't use zoom you don't need to bother with this.)

Less and more distant things

If the nearest object of the scene is nearer than 2 meters to the eyes (cameras) then the two cameras or the shift between the left and the right photo) should be nearer as well. When we watch the photo made this way the object should appear as in longer distance - at best in 2 meters.

If the nearest object is further than 2 meters it's a good idea to use a longer distance between the left and right camera. The 3D effect will be emphasised. If you take - for example - a photo of a castle and between you and the castle is a tree in the distance 30 meters from you

(and no object is nearer than the tree) then you could use the distance between the left and right camera 1 meter ($30/30=1$).

If the nearest object is in 90 centimeters distance then you should use maximal distance between the cameras 3 centimeters (1.18 inches; $90/30=3$). If the object is nearer than 20 centimeters then the 1/30 rule changes - the distance between the two cameras has to be even shorter. For 10 cm it's 2,5 mm (0.1 inch), for 5 cm only 1/2 mm (0.02 inch).

Some more advices

For international 3D photo competitions it is often required that all the objects on the stereoimage are behind the stereo window (for example behind the screen). Nothing can go "out" of screen. To be honest: We think sometimes it could be a very nice effect when something pops out of the screen.

But: If an object goes out of the picture (to an observer) it's necessary to place it rightly: No part of the object should cross the border of the stereo window (monitor screen).

If your 3D picture seems not to be 3D as much as you want it to be then try to convert it to black and white (in the 3DJournal software). If the black and white picture is OK then just try to lower saturation of your image – you may use the Less colors function of 3DJournal software.

How to save your great 3D photos

When you create your 3D photos everything seems great and finished and OK. But there could be one problem - saving your image to a wrong image file format can destroy your great work.

When you save a image to a file, you can often choose from variety of formats. The most often used are GIF, JPG (JPEG), TIF (TIFF), BMP and PNG. Everyone of them has it's advantages and it's drawbacks.

Advantages and disadvantages

Pictures saved as GIF or JPG could make quite a small file - much smaller than for example BMP. It's the reason why they are often used as web graphics - they can be downloaded very quickly.

Both these formats compress the image data; JPG uses losing compression - it means that some data are lost forever (for example small details in the picture). This is very unpleasant in 3D pictures/anaglyphs - their 3D effect needs sharp details. In graphical editors you can

usually set the value, which determines the quality of the compression (but: the more quality of the picture, the bigger image file).

GIF uses lossfree compression (no data are lost), but there is another problem: Standard GIF can save only 256 colors. It's not too much. In some graphical applications you can choose how to convert the full-color image to the 256color one.

The TIF format offers lossfree compression and a lot of colors - but needs bigger files. Sometimes there are problems with compatibility of this format - there are a lot of TIF standards and not every software understands all of them. Sometimes you get only a lot of random dots instead of your picture.

BMP doesn't use any compression, but offers good compatibility and full image quality. In our opinion it is the best format for archiving your own 3D images. When you save 3D image to BMP, you can experiment later with other formats (for example convert it to GIF and JPG to show it on web) - but on your disk it can be still in the full quality for later uses.

PNG is a newer standard - and now is quite widely used. It offers a good compression and you can choose number of colors. Right now PNG is maybe even better choice than BMP – if your applications support it.

How to make paper 3D photos

Yes, we all like our 3D photos in our computers, but sometimes we want to show some of them to our friends in their house or to someone in a pub and don't want to take our computers and tablets there (and the smartphones have usually too small display). But how to put the 3D photos on paper? Are there any problems or is it troublefree?

To get paper 3D photos you can choose a few ways. To print them with an ink or laser printer (it has to be able to print color pictures).

But the best way is to use the same method as with classical digital photography - using a photo studio. Many studios are able to create photos from digital data - and you only have to find the right one for your country. (Just try a search engine with good words to search - for example "digital photo development" in Google). Good studios offer the possibility to upload your images via internet and after processing they send it to your address.

Basic rules

If you want to have nice 3D paper photos, you should abide the same rules as with the 2D digital photos. The resolution of your photos should be no less than 300 dpi (dots per inch, for 10 x 15 cm (4 x 5 inches) the resolution of your photo should be at least 1176 x 1764 dots). Lesser resolution = worse quality, but don't worry - slightly lower resolution won't be visible for most people.

If you need to change colors of your photo, do it before you create the anaglyph (change colors on the left and right pictures). Not later.

3DJournal software – how to use it

During our journey around the 3D photo world we were often writing about the 3DJournal software. The first version of this software for creating of 3D photos was introduced back in 2003, but there are newer versions, of course, now. They are helpful when creating 3D images and for 3D video. And there is even a 3DJournalDX software for converting of 2D images to 3D. How to use the 3DJournal software?

Creating of 3D images

To create a 3D image you need 2 images/photos – one from your right eye view and second from your left eye view. Load both images to 3DJournal software using buttons located at it's right side. The images then will be shown in their windows. Press Create 3D image button and the 3D image is created. You can see there color ghosts which allow your eyes with glasses to see the image stereoscopically/3D. You can use not only the buttons but the menu as well.

Corrections

If the left and the right images haven't been created exactly as they should have been - and one of them is for example smaller or shifted up, you should make a few corrections now to get as good 3D image as possible. Do this:

- 1) Are depicted objects on both images of the same size? If not, use 4 buttons named Size to resize the left image as necessary.
- 2) Are the red images of the objects in the same height as their blue (blue-green) counterparts? If there is a difference between the right and the left part of the image then use rotation. By rotating to the right the left part of the photo goes up and right part down. Rotating to the left makes the opposite.
- 3) Now use the arrows up and down to position different 'ghosts' of the same things to the same height.
- 4) And now use the arrows to the left and to the right. Use 3D glasses and continue the shifting until the 3D effect is the best possible.

Tip: For quick adjustment of the position of the images use the button with 4 arrows - then in the main (3D) image click to a point in the left image - and then to the same point in the right one. The left image shifts quicker than when you use just standard arrow buttons.

Save it

Now you can save the finished 3D image. You can save the whole image or it's part only. And you can resize it as well (more about it you can read below). You can save the image as bmp, jpg, png, jps, pns - simply choose the appropriate extension during choosing of the name of the image file. Special stereoscopic files JPS and PNS are saved with the left image on the right side and the right image on the left side (cross-eyed), for other files the chosen (or default) color coding is used.

Extended functions (Extra button)

Use Extra button to open extended functions window of 3DJournal software. In this window you can:

* Set color coding of the image. The standard coding is

anaglyph for red/cyan glasses, but you can set the coding for example for blue/yellow glasses as well.

* Set the quality of saved jpg image. We recommend to use higher quality which allow to get a good 3D effect.

* Create more 3D images at once – for example for creating an animation or movie.

* Save settings/properties. This function saves for example the rotation, shift of the images, color coding, jpg quality, cropping of saved image for animations etc. So you can return to your image editing anytime and use the older parameters for example for preparing frames for your 3D movie.

Extended tools (X2 button)

Use X2 button to open extended tools window of 3DJournal software. In this window you can:

1) Set the final size of the 3D image. It will be resized during saving. It is very useful for example during creating of 3D images for your 3D HD movie.

2) You can rotate the left or the right image bottom up.

It is very useful if you need to take you pictures/movies using cameras bottom up. If the images are of different resolutions/sizes then you can use Smart resize to make them of identical size (the bigger one is resized).

3) Change the colors - you may choose less colors for a better 3D effect or the Live Colors to get results with better colors.

How to crop the image

Press the scissors button to set how you want to crop the image. It will be cropped during saving. At first you can click to the image for choosing the let-top edge of the image, then the right bottom one.

It is recommended to crop the image at least when using jps and pns stereoscopic file formats.

How to use the zoom

You may use the button with magnifier to see the 3D image in its full size - and the you can precisely set the right and left images to fit together and set the region for cropping of the image with maximum accuracy.

Press the button again to see the image in its standard size. Click to the right part of the image to shift it left, you may similarly click to the left, up or bottom part of the image. In case of big image and many operations the shift may take some time.

3D videos and 3D movies

More about how to create a 3D video with the 3DJournal software you can read in one of the following chapters.

Easily convert your photos to 3D

Do you own a lot of photos and you would like them to be 3D? The solution is simple: Just start 3DJournalDX software (available at www.3DJournal.com) and convert your photos to 3D. How does it work?

Human brain is able to distinguish what is in the front and what is behind it using a lot of clues. These clues are on every image. For example bigger figures are usually in the front, the small ones are in the back. And then there are shadows and focus of the image. And on the real 3D image the eyes – and then the brain – can see two different images – one by the left eye and one by the right eye. It is the same like in the real world. This is the reason why 3D images are so realistic.

And how to create a 3D photo from a 2D one? It is simple: Just use the right computer software and you are able to convert any ordinary photo to a 3D photo. In the best case you should tell the computer which figures on the image are in the front, what is little bit behind etc. – and how far it is, but thanks to the other clues it is usually enough if you tell the computer about

the most important objects on the image. And then the image can be converted to 3D.

The simplest way how to tell the information to the computer is this: Use colors. How? Use bright colors for the foreground objects and darker colors for the background objects. The man in the front will get white color, the car behind him will get a grey color and the house in the background stays black.

Is it really so simple? Yes it is. Just load your photo to your computer and to 3DJournalDX software, use the tool for making lines to outline the object in the front (for example the man), then use the fill tool – and fill the man with white color. Don't change the background – it should stay black. You may outline some more objects if they are on the photo – between the man and the background – by a grey color (and fill them).

You can switch between 2D and 3D image anytime – so you can see progress of your work. When you are happy with your 3D image you can save it.

2D to 3D: Step by step

So – how you can convert the ordinary photos to 3D photos – step by step? Load the photo to 3DJournalDX Software (available at www.3DJournal.com) using the button located at it's right side. The image then will be shown in its window. 3DJournalDX will quickly prepare a basic (black) 3D mask which will be shown as well there. Press Create 3D image button and the basic 3D image is created. You can see there color ghosts which allow your eyes with glasses to see the image stereoscopically/3D. The basic 3D image should be now visible slightly behind the computer screen. (For almost all the operations mentioned here you can use not only the buttons but the menu as well.)

Learn to work with 3DJournalDX easily

The 2D image is converted to 3D using a 3D mask. The mask is easy to use - and with the mask you can tell the computer how to create a 3D image. The basic 3D mask is black. Try to work with the mask now:

- 1) Click to the button with black eye - beside the Open 3D mask button. (We suppose you loaded your 2D image and pressed the Create 3D image button already.) Now you can see your black 3D mask instead

of the 3D image. (If you use the same button again you can see the 3D image again.)

2) Look at the tool buttons under the Create 3D image button. Click to the first left button (with a line). Then click to the mask in the main window. You can see a white dot. Move the mouse and click again. Move and click. You can create lines this way. And you can create figures using the lines.

Beware: The lines may look like they are not solid. But the spaces between them are not real. The reason is the mask is usually resized (downsized) to the size of the screen.

3) Create a closed shape using the lines. For example a square. Click to the button next to the first one. It is the fill button. Now click to the square. It will be filled with the color. Beware: If the lines of the square are not properly connected, the color will flow outside of the square.

4) Press the button with the brush. You can create dots now. It is useful when making small corrections of the 3D mask.

5) If you make a mistake you may press the left arrow button for a step back (undo). To return undo press the right arrow button. You may go as far as five steps back.

6) Under the tools there is a tow bar and arrows for color selection. From the white - number 255 - to the black - number 0. If you want to set a color which was used previously somewhere in the mask then click to the pipette button and then to the appropriate place in the mask.

How to create a very real 3D image

On the basic 3D image mentioned above all the parts are shifted a little bit behind the screen of the computer. Let's shift the objects, which should be in front, well, to the front. It is easy. Just mark the places where they are - using a lighter color on the mask. The lighter color the nearer the object will be.

Example: Just imagine an image, where is a man in the front, a car just behind him and an house in the background. How to convert this scene to 3D:

1) Press the button with colored eye (just beside the Open 3D Mask button); you can see only your 2D image in the main window now.

2) Use white lines to encircle the man on the image in the front. Fill it with the same color.

Beware: You will see no changes during the painting (but you can see some of them in the reduced view of the mask in the right window). This is because you switched to the 2D view. But all the changes are recorded.

3) Choose a darker color, for example 200. Encircle the car. Fill it.

4) Use the color eye button to switch to 3D. You can see the 3D image - the man in the front, the car behind him and the rest of the scene in the background.

Tip: To make even the details 3D you can use slightly different colors for them. For example white color for the nose and the belly of the man and a grey for its hand behind his back.

Save the 3D image

Now you can save the finished 3D image. You can save the whole image or it's part only. And you can resize it as well (more about it you can read below). You can save the image as bmp, jpg, png, jps, pns - simply choose the appropriate extension during choosing of the name of the image file. Special stereoscopic files JPS and PNS are saved with the left image on the right side and the right image on the left side (cross-eyed), for other files the chosen (or default) color coding is used.

You can save the 3D mask as well. For more complicated changes on the mask you can use a graphics editor and then load the mask to the 3DJournalDX again.

Extended functions (Extra button) Use Extra button to open extended functions window of 3DJournalDX software. In this window you can:

- 1) Set color coding of the image. The standard coding is anaglyph for red/cyan glasses, but you can set the coding for example for blue/yellow glasses as well.

2) Set the quality of saved jpg image. We recommend to use higher quality which allow to get a good 3D effect.

3) Save settings/properties. This function saves for example the color coding, jpg quality, cropping of saved image etc. So you can return to your image editing anytime and use the current parameters. The 3D mask is not saved here.

Extended tools (X2 button)

Use X2 button to open extended tools window of 3DJournalDX software. In this window you can:

1) Set the final size of the 3D image. It will be resized during saving.

2) Set the pen width (for the dots and lines).

3) Set the Fill mode - you can choose a second color for gradient fill, rotation of the gradient and gradient mode (concentric, linear). The gradient is very useful for a surface, where one part is far away and one part is very near. Like, for example, sea going from you (this part

should be white on the mask) to the horizon (this part should be black on the mask).

4) Change the colors - you may choose less colors for a better 3D effect or the Live Colors to get results with better colors.

5) 3D effect: Set the intensity of 3D effect here. Use the shift to place bigger part of the image behind the screen (255 means all the image is there) or to the front of the screen (for 0 all the objects will be in front of the screen; but it is not recommended).

6) 3D correction: If your mask does not fit exactly to the image you may try to use the correction here. If it does not help then you should use the pen to make correction on the mask - to fit.

How to crop the image

Press the scissors button to set how you want to crop the image. It will be cropped during saving. At first you can click to the image for choosing the left-top edge of the image, then the right bottom one.

How to use the zoom

You may use the button with magnifier to see the 3D image in its full size - and then you can precisely paint the mask and set the region for cropping of the image with maximum accuracy. Press the button again to see the image in its standard size. Click to the right part of the image to shift it left, you may similarly click to the left, up or bottom part of the image.

Tips and tricks

- 1) If you use double-click during cropping then you can see rulers which can help you to find the right place to crop.
- 2) For spherical objects in the front (like, for example, a ball) use concentric gradient fill. Encircle the object using lines before the fill.

More information

If you want to use the 3DJournalDX Software on a computer with a small display (for example on a Netbook), you can change the size of the user interface

using the Menu - Extra - Display Size.

How to record your first 3D movie

When you watch a 3D movie - for example in the IMAX 3D cinema or at home in you 3D TV - you maybe think about creating of your own 3D videorecordings. No problem. In this article you can read how to do it - with only one or two movie cameras.

Only a few people have two identical digital movie cameras at home. If you have them then it's very easy for you to create a 3D movie. Just place the two cameras beside each other - like 2 still cameras when taking 3D pictures - and start recording. (You can even try to connect the 2 cameras to start recording synchronously). After finishing the recording you have only to do a few actions described later in this article.

The second choice is to buy a special 3D adapter for your movie camera - but it's not cheap nor universal solution.

What is easily affordable is the third choice - to use a movie camera and a digital still camera which can record short videos. It's sure that the quality won't be

so great like in 3D cinema, but it's worth trying - today's photo cameras take a very good video. Or you can use just two digital still cameras – the same or two different ones.

Recording of the video

Place both cameras (still, still and video or 2 videos) one beside the another - each of them should be directed in the same direction - to the scene. Keep the same rule as with taking 3D photos - the distance between the cameras should be $1/30$ of the distance from camera to the nearest recorded object. If the nearest object is 90 inches away, the cameras (their lenses, to be accurate) should be 3 inches one from the another.

Prepare your actors and start recording - simultaneously at both cameras. It's only a small chance to start the recording absolutely synchronously, but it's not a serious problem for home 3D videos.

Download both recorded movies to your computer as usual.

Creating of a 3D video - first method

The first method of creating a 3D movie uses an appropriate video editing software with color effects. You can use free software Zwei-Stein, which is possible to download from www.thugsatbay.com. Install the software and run it.

Now click with the right mouse button to the text "Right click here to import media clip". Choose Import media clip and load your right-side recording (recording from the right camera). Then click to the same place once again and load the left-side video.

Click to the first recording and use the button Add Video Effect - select Basic Effects - Mapper. Set Map Green and Map Blue to 0, upper bar of Map Opacity set to 0.5.

Click to the second movie and Add Video Effect - Basic Effects - Mapper. Set Map Red to 0.

Both videos were probably recorded by different camera - and shows different size of the scene. Click to the recording which shows a bigger part of the scene

and resize the frame in the left upper corner of Zwei-Stein software to select only the same part of the scene, which is recorded on the second videoclip.

Now shift the clips on the timeline to show the same moment in the same time on both clips. You can check it visually in the preview window – on the right side of the software window. To show different part of the clip just use the bar above the clips.

Finished video can be saved by File – Export menu.

The 3D video is created using opacity - not by adding colors - and the video can be quite dark. If you want to change it then use a video editing software to change brightness and saturation. You can change source clips or 3D video as well.

Creating of a 3D video - second method

You can use 3DJournal software to create your 3D videos as well. How? In the first step you have to convert the video to single frames. You can, for example, use VirtualDub software (it is free, available at www.virtualdub.org) and save/export video as a

sequence of images. Do the same for records from both cameras.

In the 3DJournal software open the first frame of each record (the left one and the right one) and then use the appropriate button to create a 3D image. Adjust the picture as necessary. (It is a good idea to do it while wearing 3D glasses.) Use scissors button to select which part of the image should be saved, if necessary, then set the final size of the frames in X2 menu (eg HD) and save the first 3D image in the stereo jpg (JPS), such as 3D0001.jps. In the Extra menu fill in the number of pictures and start processing.

In VirtualDub, open the first frame (3D0001.jps), set the right Frame rate (most appropriate value is usually 30, set it on both places Change frame rate ... and Convert to ...) and the compression needed - DivX MPEG-4 (you can also specify the quality, eg 6). In the Audio menu, you can set the sound source. And save as AVI. And this is all.

This way you create a 3D video appropriate for uploading to Youtube (more about it later) and for some types of 3D TVs. If you want to create a 3D video in

anaglyph – for 3D red/cyan glasses, just set it in 3DJournal software and save to jpg.

3D video step by step

Here is the procedure, described step by step:

1) Save left images of your animation/movie to one folder. Save right images of your animation/movie to another folder. Use the VirtualDub software mentioned above for this task. The pictures should be numbered, for example this way: Left001.gif, Left002.gif, Left003.gif and Right001.gif, Right002.gif, Right003.gif etc.

2) Load the first left image and the first right image to 3DJournal software and make all things as usually. Then save it.

3) Press the Extra button. You can see filled in image names – and you can fill in only the number of 3D images to create. Press Start processing button. All the images will be processed in the same way as the first one – including rotation, shifting and cropping before saving.

4) Using created 3D images you can create a 3D animation or a 3D movie as described for example in this article .

Tip: Two buttons with double-arrows let you to go through numbered images forward (for example from 001.jpg to 002.jpg, 003.jpg etc.) or backward. If you press the Shift key and press any of the mentioned buttons, only left image changes. This will help you to easy synchronize images from two unsynchronized cameras.

That's all

It's necessary to say, that videos recorded by different cameras may have a different framerate - and it may be visible in the 3D movie. If the cameras aren't properly synchronized then there can be seen these differences as well. But it shouldn't be a big problem. When you stop the 3D movie it's visible - but when you watch it in move the result should be good for home videos.

Tips and Tricks

If your camera is using a video format that is not

supported by VirtualDub, convert it into a standard format using a free Video Converter, for example by iWisoft .

To synchronize the two videos you can use buttons with the double arrow in the 3DJournal software. You can go through the video frame-by-frame forward or backward. If you simultaneously hold down the shift key, then you move only the left image.

How to create a 3D movie/3D video for YouTube:
Choose jps files and resize to HD or Full HD. Create a movie from these images. Upload to YouTube and use their online help or informations from this book.

Convert your 2D movies to 3D ones

A lot of us have at home 2D video archive. Recordings from holidays, birthday parties etc. Would it be possible to convert them to 3D? The answer is: Yes, it would, but...

This advice is based on a suggestion of 3DJournal.com reader Radek Skacik. We have discussed it with him and then made a lot of experiments. Then we decided to bring this idea to you.

A little bit of theory

Videorecording usually shows a movement. Let's say it's a ball in the front of the scene flying to the right. It means that when you watch the film, then you can see, that on every field is the ball a little bit more shifted to the right.

And now imagine this: Take the red component from the first field and blend it with the red/green components from the second one - and use the new

picture as first field of a new video. Then do the same for the second and third field, third and fourth ones... What will you get?

When you use anaglyph glasses your right eye can see the red component of the image (now the "older" field where the ball is more to the left) and your left eye green/blue component (the ball more to the right). But this - this is the principle of 3D pictures in anaglyph!

Just do it

Now you probably know, how to convert your 2D video to 3D in praxis. Yes, just convert your 2D video to frames – the same way we describe in the chapter about 3D video. And then use 3DJournal software: Open the left frame and the right one (which – in this case – will be probably the next or the previous frame) and create the first 3D frame. If it looks good you may convert more following frames at once.

When all frames are finished convert them to 3D video again. Use the same procedure described in the chapter about 3D video. And this is all! You have your converted 3D video!

To say the truth: You can use the 3DJournalDX software to convert your 3D video frame by frame. But it would be very time boring and time consuming. Our experiments have shown the method described above has usually very acceptable results for most home videos – and it is possible to convert the video from 2D to 3D quite quickly.

The best 3D videos

It's not everytime true that there is only one moving object on the movie and that it moves only to the right. Main object can move to the left, then to the right, down, up... Then it's necessary to play with different parts of the movie to get the best 3D video possible.

Sometimes it is even impossible to convert your video to 3D. But often can be usefull when you do a few experimets.

How to upload your 3D video to YouTube

You can watch 3D videos in 3D TVs, that are becoming increasingly popular, but also on the popular YouTube site. Indeed, YouTube directly supports 3D videos and allows you not only to upload them, but also to switch between different levels of quality and different ways of 3D types. So how to upload your own 3D video to YouTube?

Log in to your account on YouTube and upload video in the normal way. In the Tags box then type: `yt3d: enable = true`. If the video is widescreen (maybe HD), add this: `yt3d: aspect = 16:9`. (You can also add other tags, such as: `yt3d: enable = true yt3d: aspect = 16:9 London metro`.) (The Youtube service still evolves; these advices are valid in the time this book is prepared for publishing.)

Then wait a while until YouTube converts your video into all levels of quality. And now you can play your 3D movie! Do not forget to show the movie to your friends

on Facebook.

If YouTube shows your 3D HD video in a lower quality, try to wait. Converting to HD takes time. Remember that YouTube can switch the video display quality switch and the way how it displays the 3D Video (anaglyph, striped, yellow-blue, cross-eyes and more.).

A few of the last words

We hope you now have all the important information about creating your own 3D content – 3D photos and 3D videos.

If you are still not absolutely sure how to create your first 3D photo or 3D video, try free video tutorials at www.3DJournal.com. You will see the procedures – and learn all you need in less than 2 minutes! And you can even download the free versions of 3DJournal and 3DJournalDX software there. Give it a try!

We wish you many great family 3D photos and 3D videos! And, maybe, even a great 3D movie many people from all over the world will admire at YouTube.