

# brand security systems Designer<sup>®</sup>

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powered by 

## User Manual

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## Introduction

Software product BSS Designer<sup>®</sup> is intended for screening both monophonic and color images with protection against falsification. The image screened in program BSS Designer<sup>®</sup> does not differ externally from images screened in other way, but at the application of a special film on it, the latent protective patterns are shown. At copying images the latent patterns are not reproduced. There is also a number of additional ways of definition of authenticity. The basic advantages of the new technology of protection are the highest degree of security in comparison with other technologies of protection at a stage of preparation of a layout, and also simplicity in work, speed and significant simplification of work of the designer.

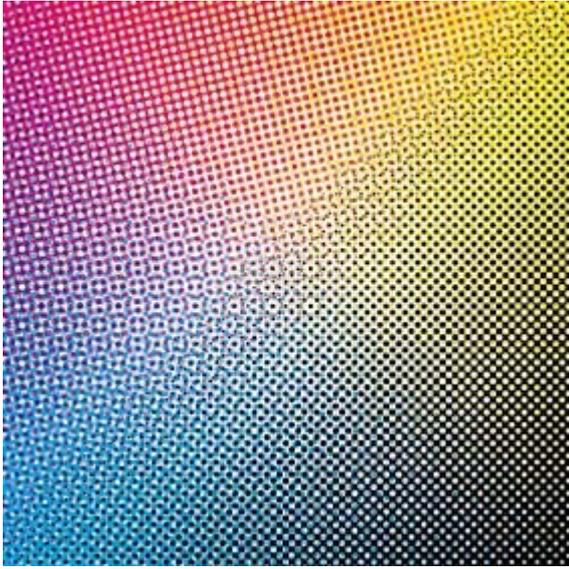
The newest technology Ghost on Duty<sup>®</sup> is the most economic and effective decision of protection of printed matter from falsification. For printing of images with protection no special equipment is required, and special materials are not necessary. Ghost on Duty<sup>®</sup> technology and program BSS Designer<sup>®</sup> allow you, not changing the design, to make already developed and only projected valuable forms, packing of branded production, labels and many, many other products much more protected.

## Technology of protection of printed matter Ghost on Duty®

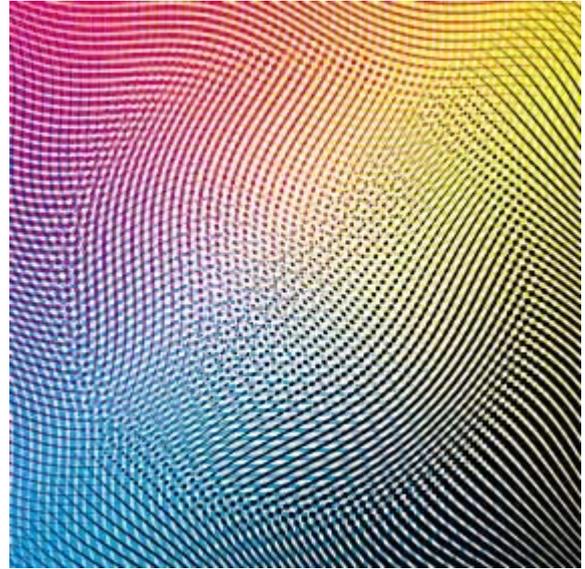
All of us have got used to see decorative guilloche-elements, engraving style, the microtext and complex vector grids on securities. All these elements give to the document the external importance and solidity, and, of course, it is clear to everyone that to create, and moreover, to repeat such a layout, is not very simple. Thus the essence of protective effect of all the above mentioned elements is expressed by three key rules:

1. The elements of a pattern should be thin enough so that at scanning there would be a maximum number of errors and discrepancies.
2. The elements of a pattern should be complex and not regular so that there would be difficult to repeat, outline, duplicate or retouch them.
3. The elements of various colors should be applied against each other so that after scanning them it would be impossible to divide them into different layers.

In order that the well known protective elements would be not only decorative, but also bore a real protective function, it is not sufficient just to acquire expensive programs. It is necessary to understand manufacturing technologies and know well the capabilities of modern copying equipment. Inexperienced experts frequently maintain that protective elements are by all means the vector graphics. Such a mistake is easily dismissed if one knows that any kind of graphics, before getting onto the typographic plate, is transformed to a one-bit image with high resolution. The end result of work with the program BSS Designer® is that one-bit image with high resolution, but at the same time the uniqueness of the generated pattern is incomparably higher, and the procedure of its creation is no more complex than the output of the image on a usual RIP station.

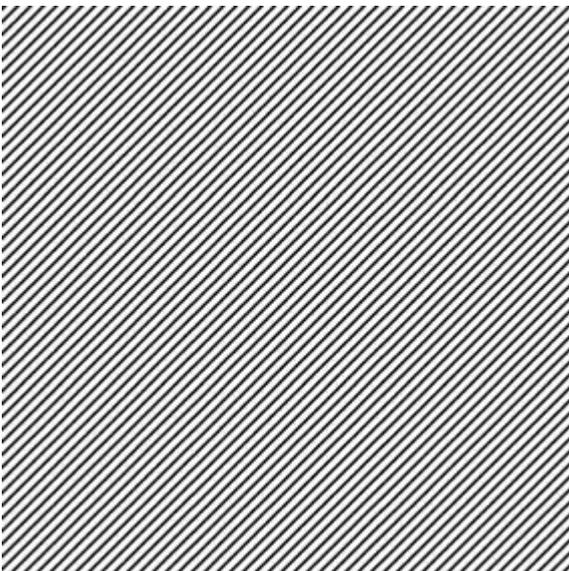


Fragment of the image screened by usual RIP station (Increased)

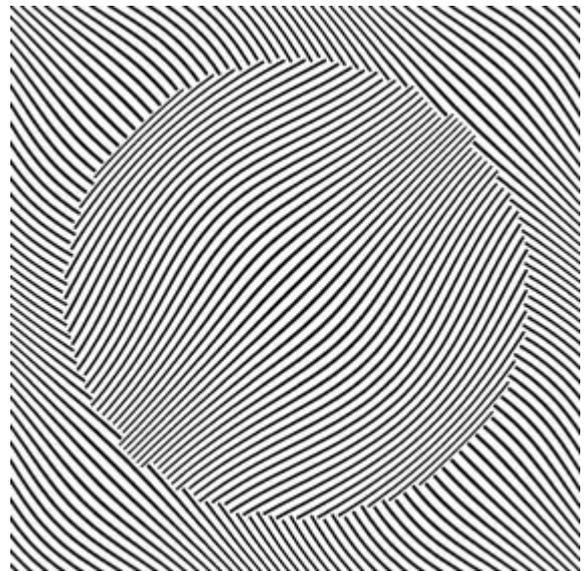


Fragment of the image screened by program BSS Designer® (Increased)

The feature of technology Ghost on Duty® is that externally a color or monophonic picture does not differ in any way from that which was screened in a usual way, but the latent deformations of geometrical structure of a raster do not repeat at usual copying. Having the printed sample, it is impossible to distinguish the additional image defining geometrical distortions, but it is easily possible to notice its display in moire at applying a special verifying film. The verifying film will help to define authenticity, but in no way will help to make a forgery.

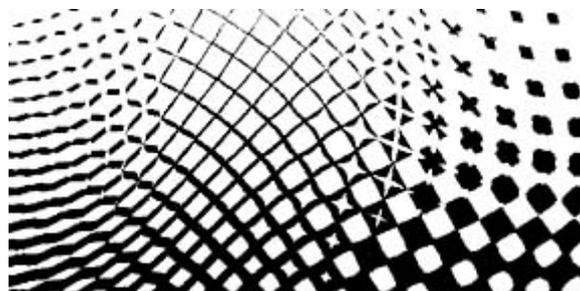


Verifying grid showing the latent image on the original (Increased)



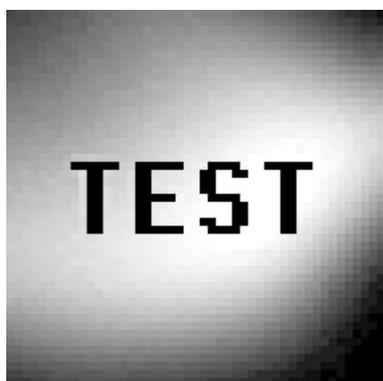
Verifying grid revealing differences from original structure (Increased)

High uniqueness of the generated pattern tells that the relative area of each element of a pattern is determined by the tonal gradation of the screened image, the form of each element is determined by the content of the second image, and the displacement of coordinates of each element is determined by the content of the third image or the mathematical formula. If you screen the color image at ruling 133 lpi, each square inch will contain more than 70 000 unique elements!



Fragment of the image screened by program  
BSS Designer® (Increased)

One more important feature of the program is the possibility to transfer the maximum number of fine details at a raster large enough. If the initial file at the resolution of 600 dpi contained the readable and contrasting text (for example, in black and white, font - "Arial", height - 1,5 points or 0,38 mm, all capital letters) you can read it on the printed sample either, not regarding that the established ruling was only 133 lpi.



Fragment of the input image. Font size – 1.5  
points (0,38 mm), the resolution – 600 dpi  
(Increased)



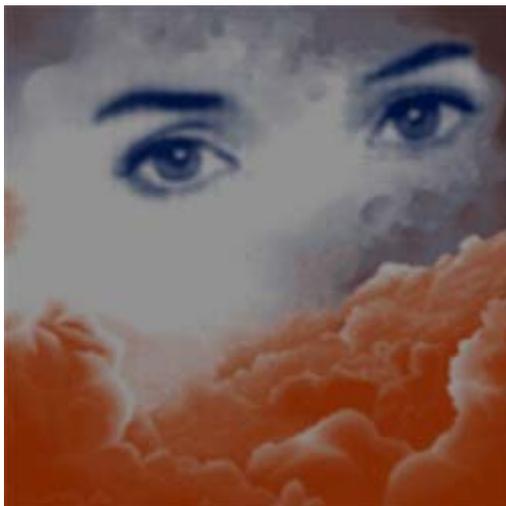
Fragment of the image screened by program  
BSS Designer®. Ruling - 133 lpi (Increased)

The most usual at first sight image may contain one more or two latent images..



Image screened by program BSS Designer®

The display of latent images at imposing a verifying grid with the undistorted structure occurs because of the arising effect of moire. In perpendicular directions two different latent images may be shown.



Display of the latent image at the application of a regular verifying film



Display of the latent image at the turn of a verifying film through 90 degrees

## Definition of authenticity using technology Ghost on Duty®

Unlike classical guilloche-elements, Ghost on Duty® technology gives much more possibilities of definition of authenticity.

Even at copying usual color images it is not always possible to keep precisely all the shades, therefore first of all it is necessary to pay attention to the color conformity of images. If at scanning and the subsequent printing of vector patterns the thickness of the lines has changed by some micron, it will not be as appreciable as considerably deformed shades of the image using Ghost on Duty® technology.

The second important factor is image sharpness. At usual copying (scanning, removal of moire, repeated screening and printing) the quality of the image is considerably worsened, fine details disappear, the picture becomes blurred.

Further it is necessary to make sure that the way of printing meets the original.

The attributes of adulteration will be:

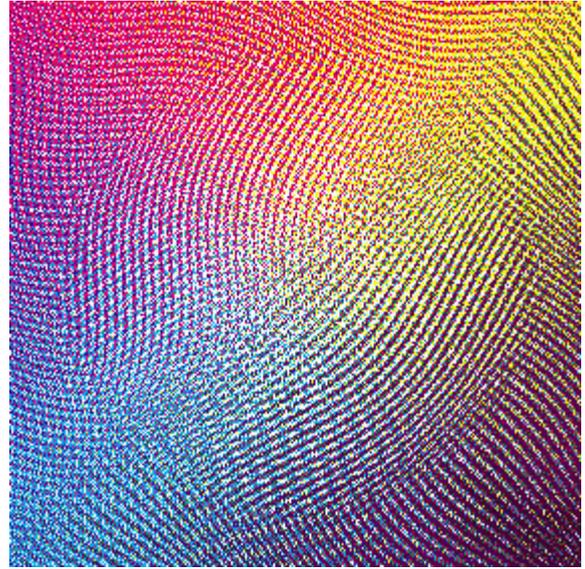
- the image is printed by a stochastic raster (more often jet printers)
- the ordered structure is not simply visible (some kinds of digital printing)
- the ink shines and is felt to the touch (some kinds of digital printing)
- halftone dots are much larger and are located less often (there may be various kinds of printing), it is possible to distinguish the geometrical structure of an original raster, but on closer examination the lines will be indistinct and with dim edges (at scanning moire was not removed, at printing the fine stochastic raster or digital printing was used).

To receive a better copy other grade of paper may be used. As a rule, the obverse and reverse sides of a sheet of special paper for printers differ.

Below are given the examples of the qualitative copies made by the laser printer with the resolution of printing 1200 dpi, and jet printer with the resolution of printing 1440 dpi, the average ruling of an original raster - 133 lpi.



Fragment of the copy printed by a laser printer  
(Increased)



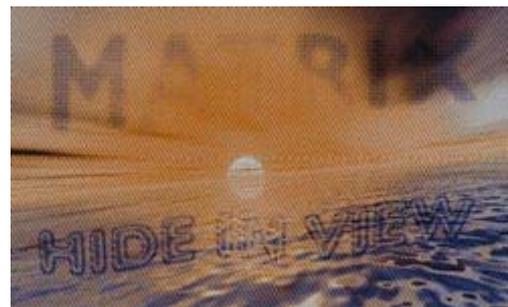
Fragment of the copy printed by a jet printer  
(Increased)

It is possible to eliminate a possibility of falsification with an application of household copying equipment, having applied the inks in printing which are not transmitted through CMYK scale.

For example, your image can be spread out into two colors opposite on scale - dark blue and orange. Now add to a dark blue color 30 % of silver ink, and to an orange color- 30 % of bronze ink. To increase the protective effect the iris or the Oryol technologies of printing may be used.



Image transferred by two colors. Screened in  
program BSS Designer®



Display of the latent image at imposing a  
regular verifying film

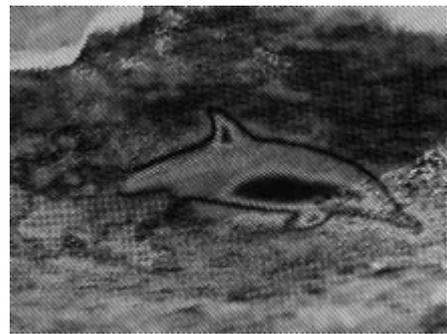
Now make sure that there are smooth transitions from one kind of a raster to another on the ordered structure of a raster, for example: line - dot - rhombus.

Only the program BSS Designer<sup>®</sup> allows to carry out smooth transition from one kind of a raster to another on one image, and there will be no strict borders between various kinds of a raster. If the image is color, make sure that the change of a raster occurs on all colors.

In order to be convinced of geometrical distortions of the structure of a raster, it is necessary to apply a simple regular grid of dense thin parallel lines on the image being checked. Having applied such a grid on any other image, you will either see nothing, or monotonous moire all over the surface, and only on the original image in iridescent contour lines the latent image becomes appreciable. If to move a verifying grid slowly over the surface of the original image, the latent image will be shown by different shades. If you are not sure that the pattern meets the original, combine a verifying grid with the kept distortions with the image. Now the appeared lighter and darker contour lines emphasize all discrepancies with the original structure. But it is advisable to start checking with a verifying grid having no distortions.

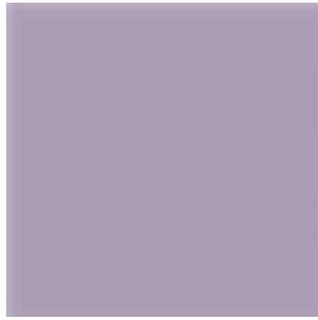


Image with "invisible" protection. Screened in program BSS Designer<sup>®</sup>



At displacement of a verifying film the latent image changes shades

Ghost on Duty<sup>®</sup> technology allows transferring in a raster of the basic image two additional images located in the same place, but not connected between themselves. Depending on the parameters set at generation of a raster, for the display of two various images either two different verifying films may be used, or the same film revolved through 90 degrees, or a film applied by the reverse side.



Smooth background printed by 40 % raster  
contains two latent images.



Display of the first latent image at the  
application of a verifying film

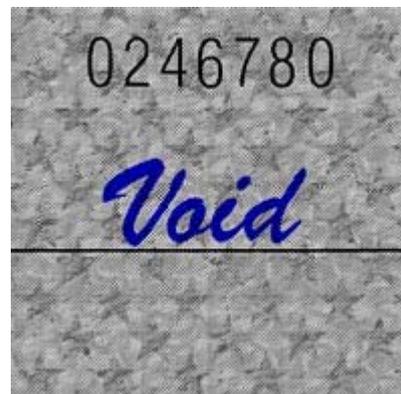


Display of the second latent image at the  
overturn of a verifying film

Due to Ghost on Duty® technology the simplest form printed in black color only gets serious protection against falsification, as this technology eliminates "unpunished" retouching of the original. We will take for example the usual form with an ordinary-looking grey background. There is a serial number and a text entered in hand on the form.



Appearance of the original document

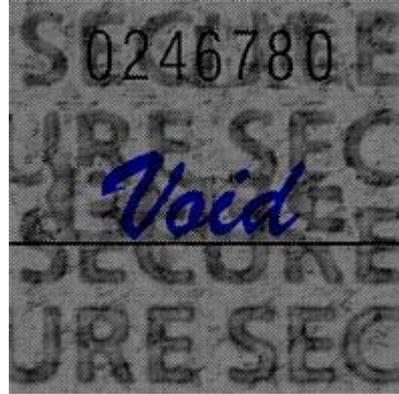


Appearance of the counterfeit document

The malefactor has scanned the image with the high resolution in a mode of "semitones" (line art), therefore the tonal conformity of the basic image has worsened at printing, but fine details and original structure of a raster (for color images such variant of scanning is impossible) have been saved. Further he has reversed the order of figures in a serial number, retouched the original inscription, using a blank background of the same document, and has written his own text on top. Externally the document may be very similar to the present, but at the application of a verifying film, the places of a retouch will clearly give out a fake.

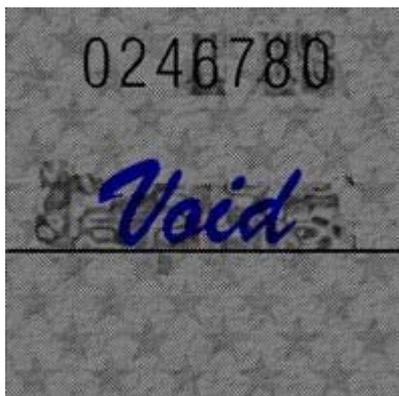


Display of the latent pattern on the original

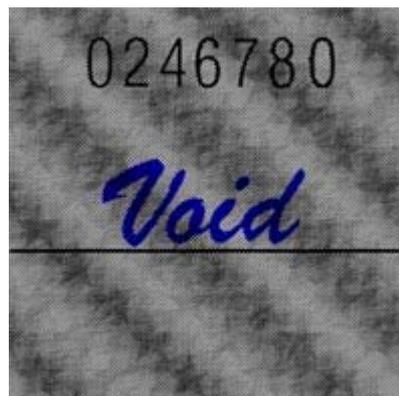


Display of the latent pattern on a fake

At the application of a verifying film having a geometrical structure of the original, moire may appear in those places where the image was changed. As at scanning and the subsequent processing of images the raster as a rule is blurred, in order not to cause some moire at repeated screening, the latent image in most cases will either be absent completely on a fake or instead of it there will be monotonous strips of moire.



Display of the latent pattern on a fake at the application of a grid with original structure



The latent pattern is absent on a usual fake

The samples of fakes on which it is possible to distinguish the latent pattern fall into the category of "super-fakes", but in this case there is also a set of characteristics distinguishing the original from a copy.

The deformed structure of a raster is in itself a serious protection as no other programs and devices use similar effects. Even having files of original images, the program BSS Designer<sup>®</sup>, and knowing parameters of deformation, it is not possible at times to repeat an original raster. The example of the image screened in program BSS Designer<sup>®</sup> with the use of decorative kinds of a raster, the modification of which is connected to the built - in generator of seed value, is given below. At each subsequent generation of the image in the structure of a raster it will be possible to see the differences from the first variant.



Fragment of the image screened by program BSS Designer<sup>®</sup> (Increased)



Fragment of the image printed with the printer (Increased)

## The basic functions of program BSS Designer®

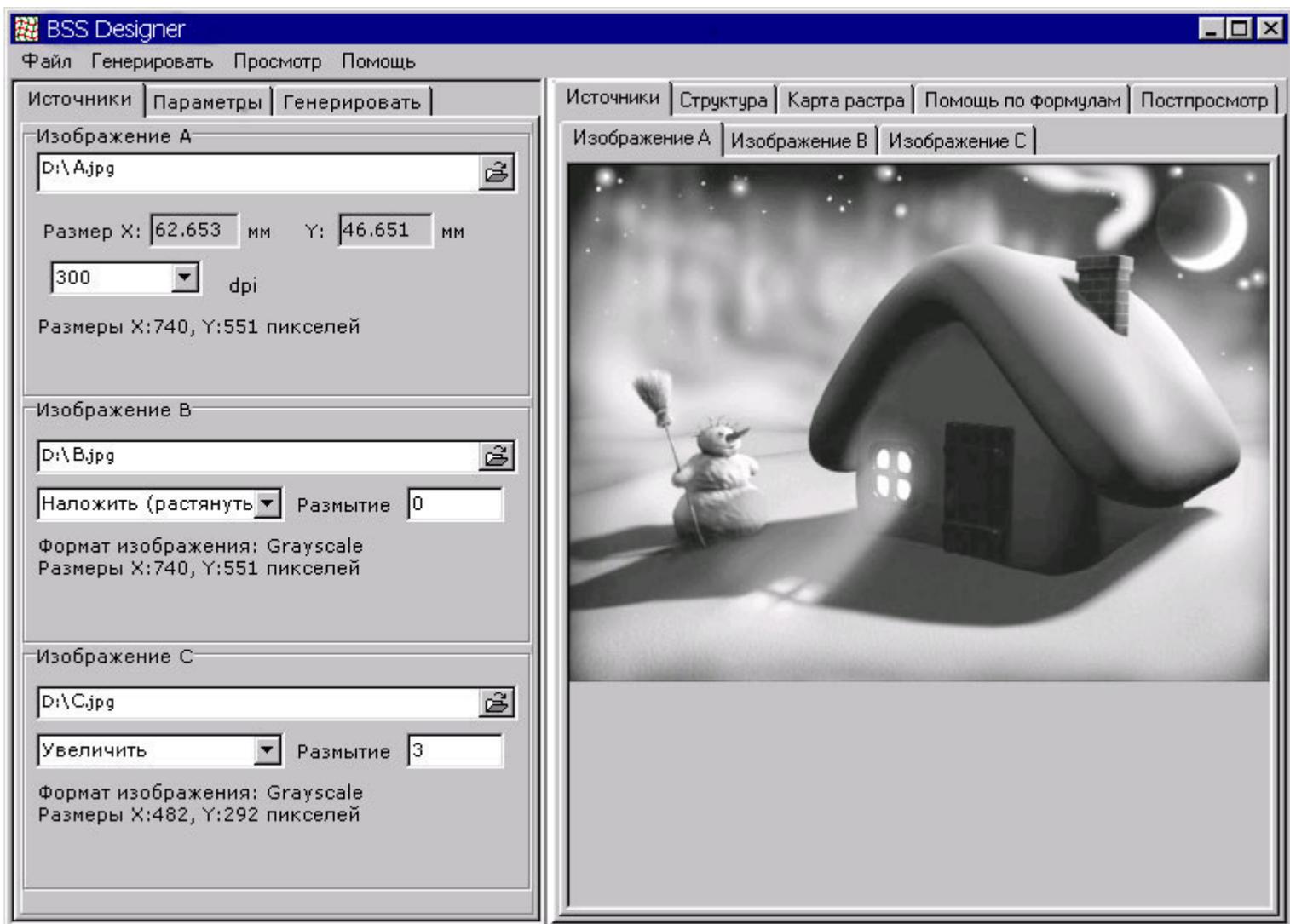
- Screening of monophonic images
- Screening of full-color images
- Use of classical and decorative forms of a raster
- Use of different forms of a raster on one image
- Smooth transition between different forms of a raster
- Change of the form of a raster based on the additional image
- Change of the form of a raster based on the mathematical formula
- Geometrical deformation of structure of a raster
- Installation of geometrical deformation by the mathematical formula
- Installation of geometrical deformation by the additional image
- Entering of one or two latent additional images
- Generation of films showing the latent images
- Generation of films for professional examinations
- Gauging on the basis of trial printing
- Dot gain compensation at printing

## The operating procedure with program BSS Designer®

Program BSS Designer® may be started on computers with operational system MS Windows 98®, Windows NT® and all later versions of OS Windows®.

The speed of work of the program directly depends on the size of the image treated, the speed of the processor and the volume of operative memory. Processing the color image of format A4, it is necessary to release a few gigabytes of a hard disk.

### Install and start the program BSS Designer®.

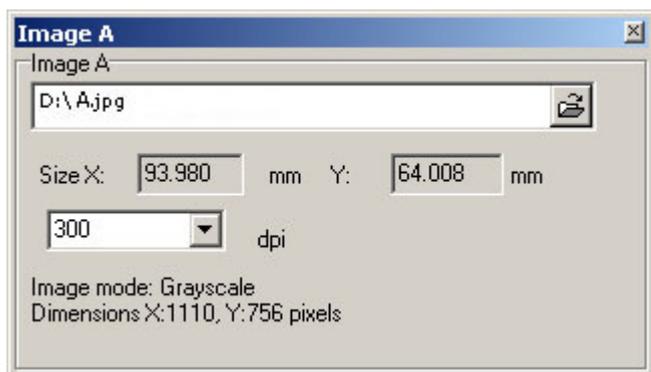


## Menu "Sources"

Specify a location of the screened image.

Images may be specified in a format \*.tif or \*.bmp, color model Grayscale (8 bits for a dot) or CMYK (32 bits for a dot).

If necessary, you may change the resolution of the input image, thus its sizes will also change. The recommended value is 300 dpi.



The loaded image can be seen in a viewing area of the program.

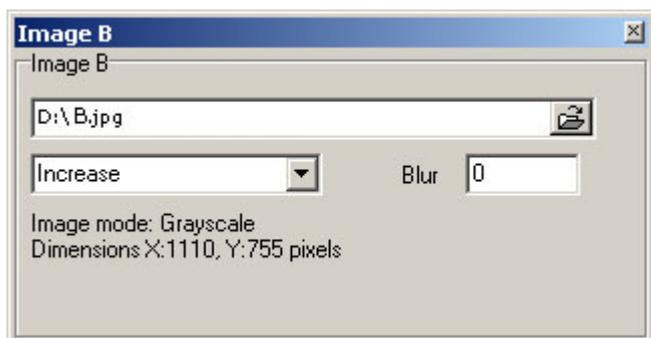
Specify a location of the additional image "B" or pass to the next item.

Images may be specified in a format \*.tif or \*.bmp, color model - Grayscale.

By default this image determines the change of the form of dots in the screened image.

Choose the position of the additional image "B" in relation to the image "A". Three positions are possible: "Increase" - proportional increase or reduction of the additional image, "Stretch" - disproportionate application, "Tile" - to spread out the additional image in "tiles", not changing its sizes.

The field "Blur" defines the smoothness of transition from one kind of a raster to another in a final composition. At screening color images sharp transitions from one kind of a raster to another are undesirable. The size of blurring is marked in pixels.



The loaded and changed image "B" can be seen in a viewing area of the program.

Specify a location of the additional image "C" or pass to the next item.

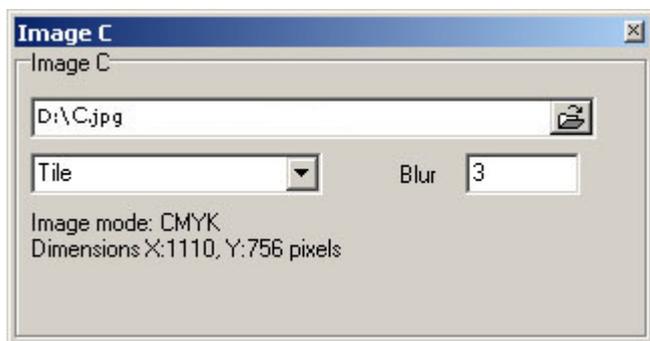
Images may be specified in a format \*.tif or \*.bmp, color model - Grayscale.

By default this image determines the change of geometrical structure of a raster in a final composition.

Choose the position of the additional image "C" in relation to the image "A". Three positions are possible: "Increase" - proportional increase or reduction of the additional image, "Stretch" - disproportionate application, "Tile" - to spread out the additional image in "tiles", not changing its sizes.

The field "Blur" defines the smoothness of geometrical distortions of a raster. The size of blurring is marked in pixels.

If the value chosen is too low, then at construction of a grid of a raster the message about inadmissible deformation may appear, besides in separate places of the image the resolution may reach inadmissible values for production, which at once becomes appreciable on the printed samples. If the value chosen is too high, the additional image becomes illegible. Therefore we recommend using a function "Auto selection", which is in the section "Deformation of Structure".



The loaded and changed image "C" can be seen in a viewing area of the program.

## **Menu "Parameters"**

Specify the exact resolution with which your equipment will be producing images for the work given (dpi). You may also specify the multiple resolution, i.e. 1/2, 1/3, 1/4 of the actual resolution of the image output. If the value is incorrectly specified, the moire effect may appear in the process of output.

Set the required value of ruling (lpi). The recommended value - 1/24 of a preset value dpi, thus the quality of the image will be maximal and moire will not arise.

You may set another value, but it is necessary to take into account that at significant decrease of the difference between dpi and lpi, the quality of the image will be reduced, and the significant increase of the difference between dpi and lpi has no practical sense. For offset printing the recommended values of ruling are 90-150 lpi (taking into account that in separate places of the image ruling will become higher). The disproportionate value of ruling for perpendicular directions may also be defined.

The value of ruling and the kind of a raster set in the device of the image output have no significance.

Set the angle of construction of a raster grid.

For color works you may choose one of the standard sets of angles of the turn of a raster:

DIN16457 – standard angles of the turn of a raster.

Green tone - minimization of moire in green tones.

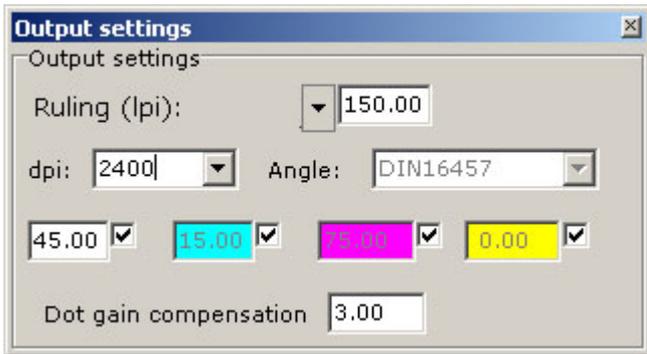
Skin tone - minimization of moire in flesh tones.

If necessary, you may set other values of angles for each color.

The values of angles set in the device of the image output have no significance.

The value of compensation for the deformation of dots is defined by practical consideration on the basis of trial printed impressions. The value 1.00 means the absence of compensation, the value > 1.00 balances the increase of dots at printing. If the value is set incorrectly, the shades of the image will be inexactly transferred, and the latent pattern becomes more appreciable.

The higher value of ruling (lpi) you set, the more attention must be given to the balance of distortion, though for the program the value of compensation will be uniform for all rulings (lpi) at the identical resolution (dpi).



Choose the kinds of rasters which will be used in a final composition.

Using rasters "Double Line", "Double Bar" and "Rhombus", the value of ruling (lpi) should be reduced twice.

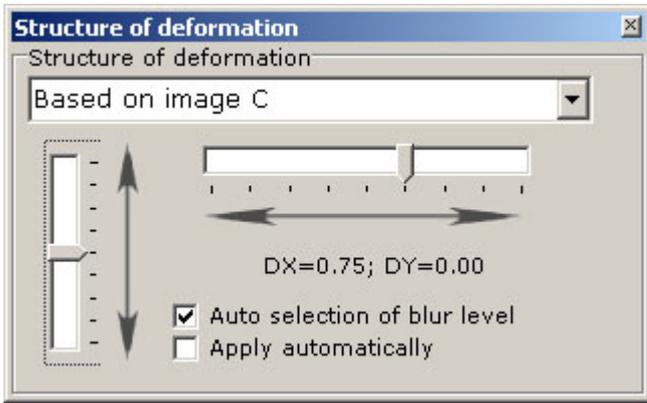
The change of dot shapes may be based on the content of images "B", "C" or the value of the mathematical formula. Variables and functions which may be used in the formula are specified in a viewing window "Functions and Variables".

The kind of a raster set in the device of the image output has no significance.

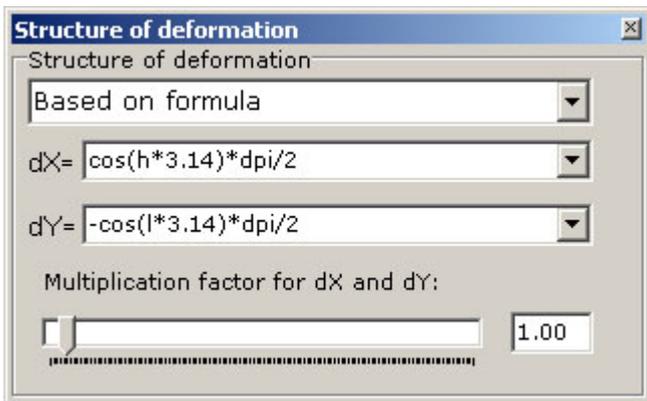
For fast generation of the map of arrangement of various kinds of dot shapes use button "F8". The generated map of arrangement of rasters can be seen in a viewing area "Raster Map".



Choose a method of deformation of structure of a raster. If the deformation is determined by the additional image, set a direction and size of the maximal displacement across and vertically, a unit of measurements - 1/lpi.



Variables and functions, which may be used if deformation is defined by the formula, are specified in a viewing area "Functions and Variables", a unit of measurements - 1/dpi. The multiplication factor is used for a fast increase or reduction of deformation.



For fast generation of preliminary geometrical structure of a raster use button "F9". The generated geometrical structure of rasters can be seen in a viewing area "Structure". At viewing green lines correspond to a direction of a raster "Line", red lines correspond to a direction of a raster "Bar".

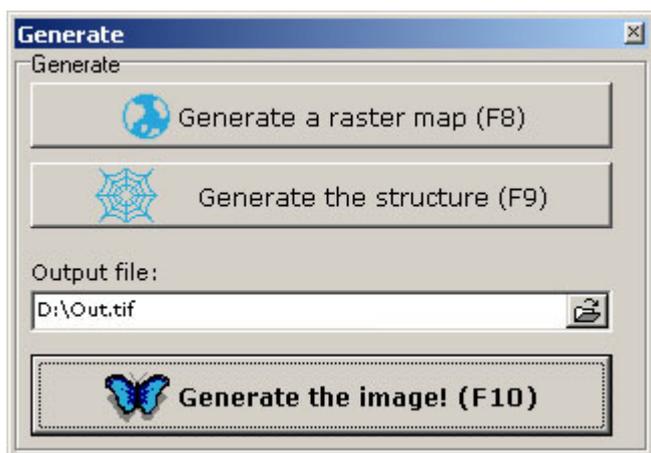
In order that the generated image would not cause problems at printing, the deformation of structure of its raster should be smooth, and if at preliminary viewing the places of strong condensation of lines are well appreciable, it is necessary to lower the size of maximal displacement. If the size of the given displacement exceeds the allowable, the program will inform about a mistake.

## Menu "Generation"

Generate a preliminary map of arrangement of various kinds of dot shapes (a key "F8"), and a grid of geometrical structure of a raster (a key "F9").

Specify a location and the name for a final file.

Generate the image. The generated image can be seen in a viewing area "Output Preview".



All the parameters set for each work may be saved and loaded again afterwards.



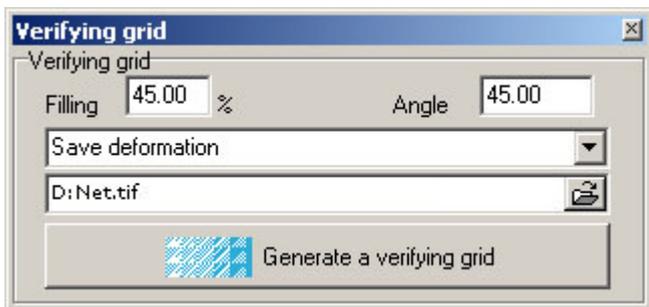
Define the percentage filling of a verifying grid (recommended value - 40-50 %).

Set the angle of construction of a verifying grid. The angle of black color is set by default. The latent image is shown most precisely on a background with the filling of 30-70 %, if a raster of black color has a smaller intensity, then for a verifying grid it is necessary to set the angle appropriate to the color CYAN or MAGENTA.

The verifying grid without distortions shows the latent image on the original, and the grid with distortions reveals the differences from the original (the first variant simplifies the initial check of a sample, and the second variant provides a more exact examination).

Specify a location and the name for a file of a verifying grid.

Generate a verifying grid. The generated verifying grid can be seen in a viewing area "Output Preview".



A verifying grid may be produced on a usual photopositive. Making a verifying grid in a different way, it is desirable to select its color in accordance with the tonal range of the image being checked.

### ***Dot Gain Tests at Printing***

Define the initial and final value of dot gain compensation and a required interval for generation of images of test printing.

Specify a location of the folder for files of test printing.

Generate the images for test printing.



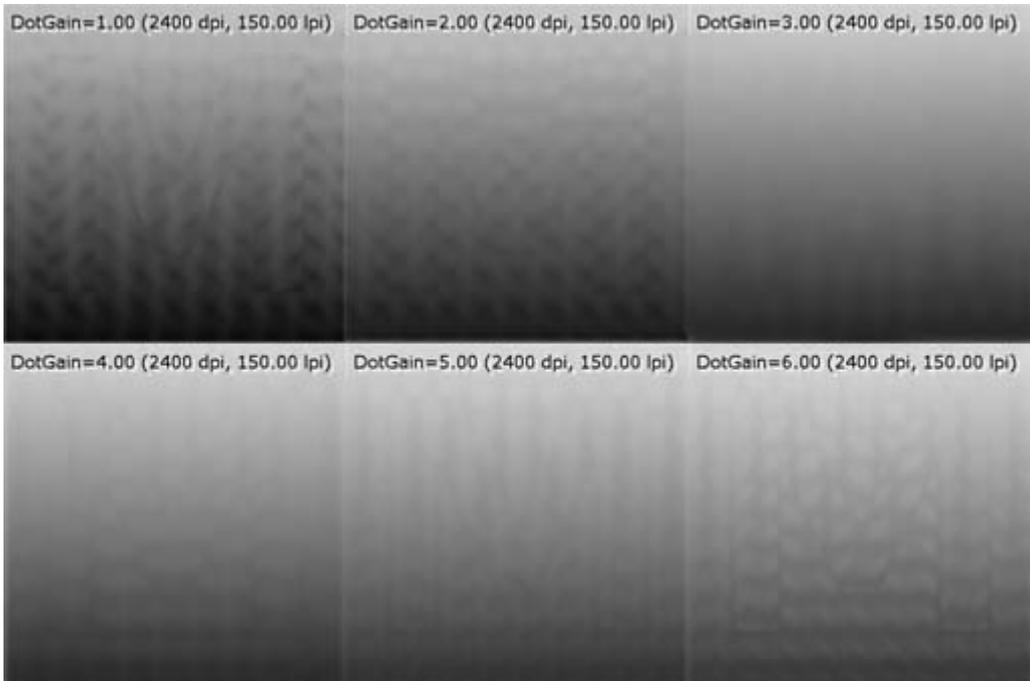
The program has used all your specified values and parameters and created the images for test printing.

Import the generated files in any graphic editor and arrange them on one sheet. The imported images cannot be compressed or dragged out.

Generate a print-file for production of a photopositive or a typographic plate. At generation it is impossible to use an option of automatic reduction of the resolution of images.

Print tests by the offset machine, using different grades of paper. Watch the observance of all technological processes.

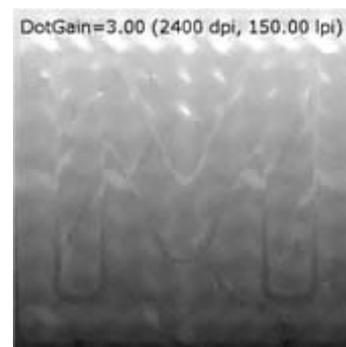
Note the positions with the smoothest background on the printed samples. The stains and the letter "M" should not be appreciable.



In further work use the values of dot gain compensation specified on the marked positions. Repeat the tests if there were any changes in the production chain (change of the equipment or materials).



Correctly chosen value of compensation



Badly adjusted manufacturing technology

The function "Dot Gain Compensation" cannot compensate for the light-shortening of the fine halftone dots, therefore it is necessary to watch for the gauging of the exposing and developing machines. Do not use too high values of ruling LPI and typographic plates of poor quality.

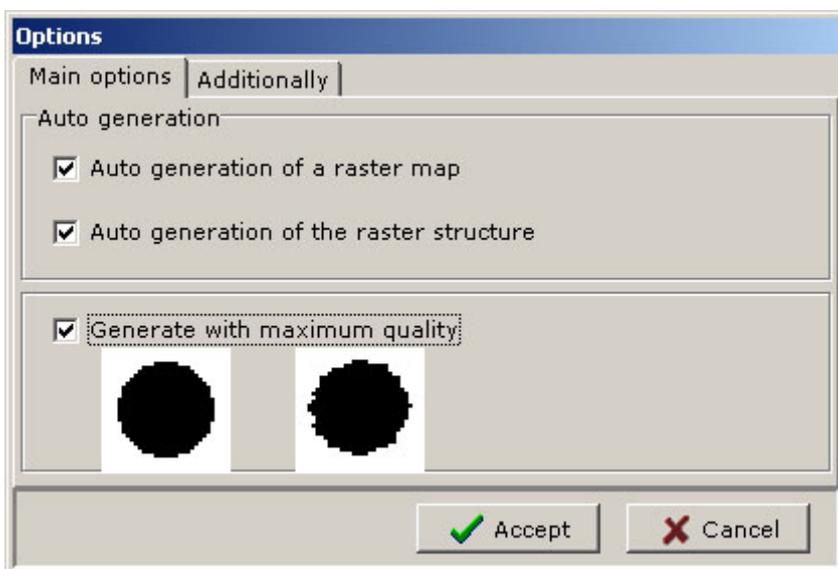
In offset printing the quality of the image depends on the gauging of the device for the production of photopositives or plates (thus the established linearization has no value, it is desirable that the device being used would demand minimal linearization), on the type of materials used (we recommend a film of Hard Dot class and high-quality typographic plates), on the adjustment and technical condition of a press (ink feed, tightness of cylinders, humidifying, replacement of wearing elements).

The deviation from the required value of compensation will not be as appreciable at usual works as on the printed tests.

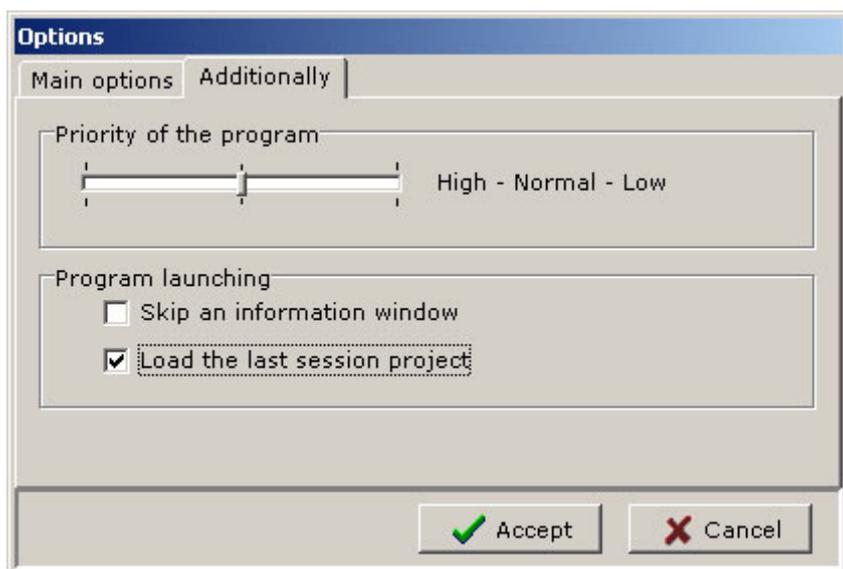
### ***Adjustments of the program***

You may specify to the program to generate the map and structure of a raster automatically before the generation of the screened image for acceleration of work.

The option "Generate with Maximum Quality" includes additional algorithms, allowing the generation of a raster with more smooth edges, thus the speed of work of the program is reduced approximately by 30 %.



You may define a priority of the program in the system.



## Use of the generated images

The generated files are one-bit images in a format \*.tif. They may be used in any graphic editors. Images under no circumstances can be stretched, reduced or otherwise deformed before they are prepared to be printed! Images can be turned only through 90 or 180 degrees. A necessary color with 100 % filling is set to the image and, if necessary, an option "Overprint".

Using the color image, import the generated files of all four colors into the graphic editor and set the appropriate coloring to them (Cyan, Magenta, Yellow, Black). Use an option "Overprint" for all four images. Position the images in the necessary place of a layout, one above another, atop of a white substrate. For convenience, group the objects making one composition.

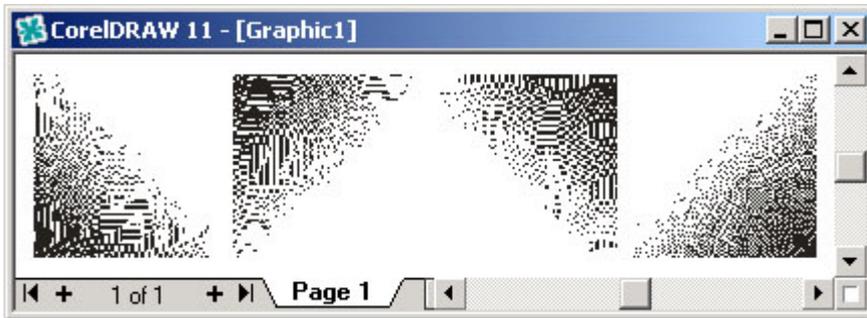
If it is necessary for you to screen the two or the three-color image, you may screen each layer separately, setting identical values of deformation, but establishing different angles of construction of a raster. The usual values of angles: for the one-color image - 45 degrees; for the two-color - 45 and 15 degrees; for the three-color - 45, 15 and 75 degrees. You may also use color layers of CMYK images. Working with multi-color compositions in the formulas determining distortions, it is impossible to use a variable "R".

For convenience of printing we do not recommend using the images with smooth backgrounds. The latent image, as well as some defects of printing will be less appreciable, if the backgrounds of the image will have some heterogeneity or a structure.

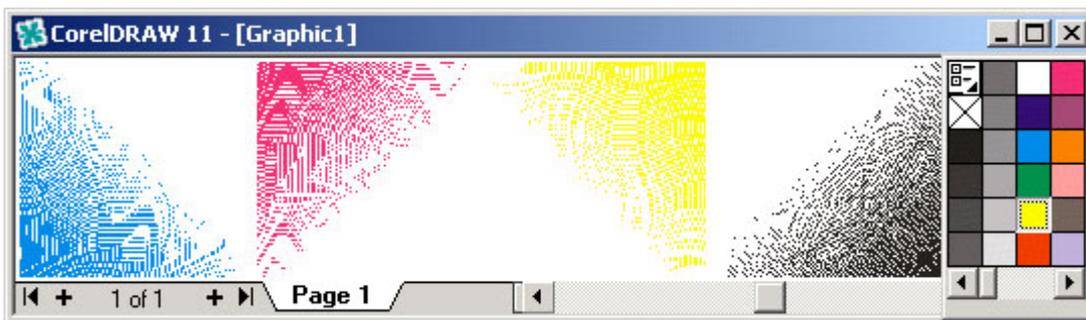
Using Hide in View technology, proofs should be made from original photopositives. Printing the layout by the printer, the protected images may have strong distortions.

## Example of positioning the screened image in a layout of program CorelDRAW® 11

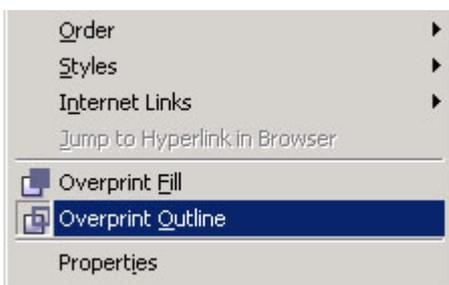
For positioning of the color image import four \*.tif files (for example: Out-C.tif, Out-M.tif, Out-Y.tif, Out-B.tif) generated by program BSS Designer® into a layout.



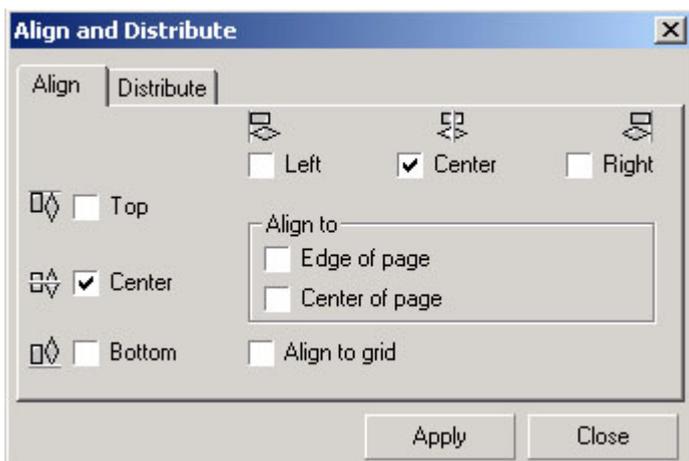
For each of the four images set the appropriate color of a line (Outline color: Cyan, Magenta, Yellow, Black).



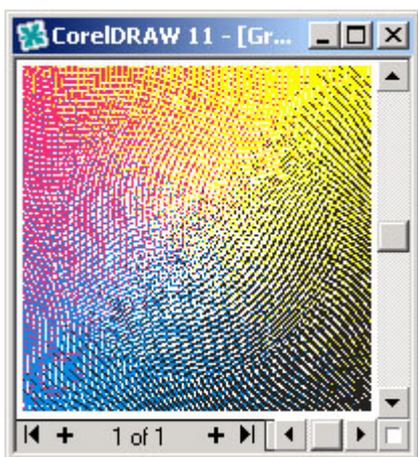
For the bottom image we set the white color of a background. For the next three images a background is transparent (Fill - none), for a line we set an option "Overprint".



Align the images in relation to each other.



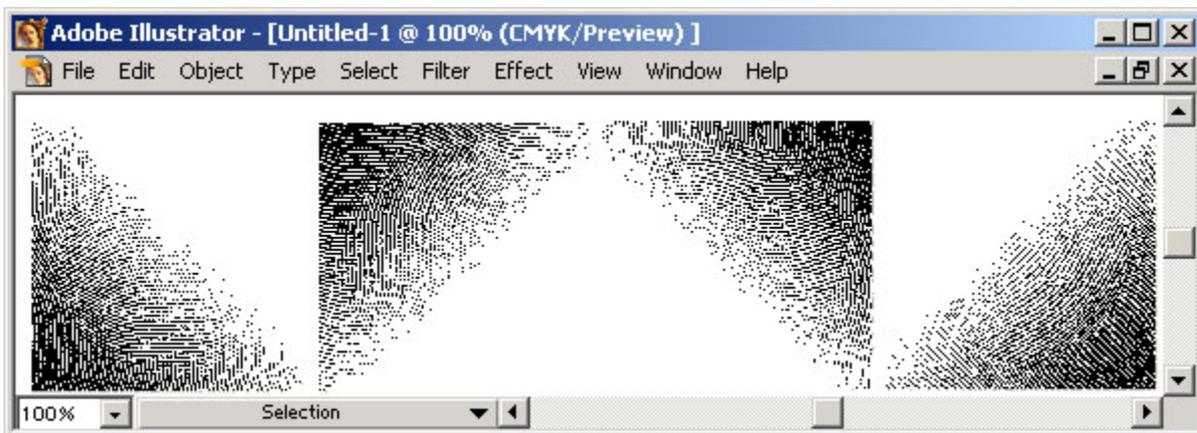
Important: it is impossible to change the sizes and the angle of inclination of images. In case of change of the sizes, the scale, proportions, positions or the angle of inclination of one or several colors, at printing of the image distortions of shades and moire may arise.



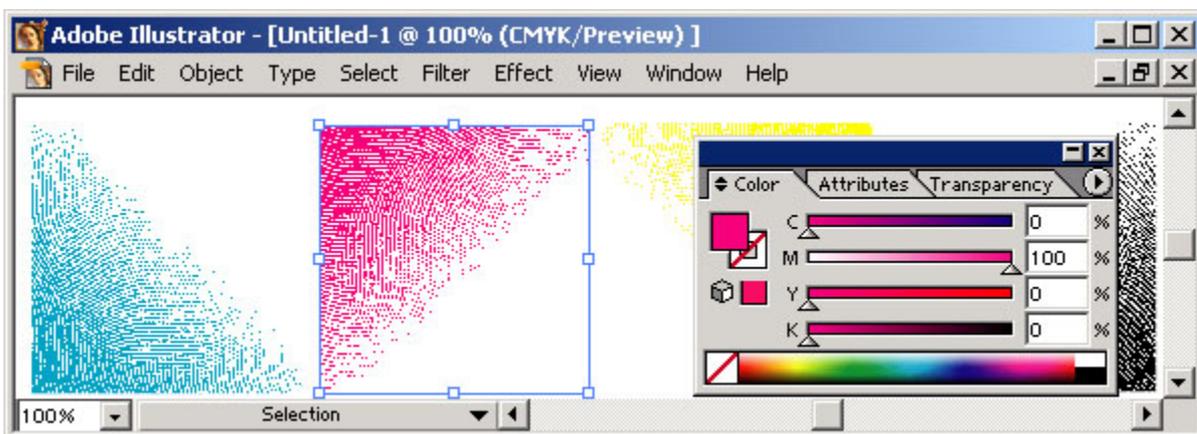
Group a composition of four layers and position it in the necessary place of a layout. At generation of print-files set the appropriate value of the resolution and do not use an option of automatic reduction of the resolution (downsampling).

## Example of positioning the screened image in a layout of program Adobe® Illustrator® 10

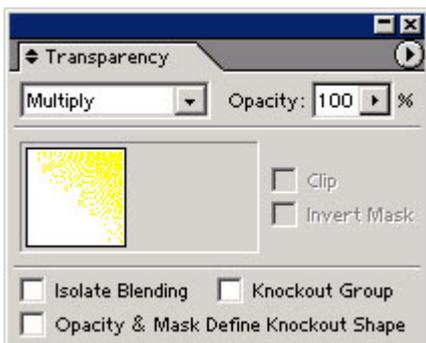
For positioning the color image import four \*.tif files (for example: Out-C.tif, Out-M.tif, Out-Y.tif, Out-B.tif) generated by program BSS Designer® into a layout.



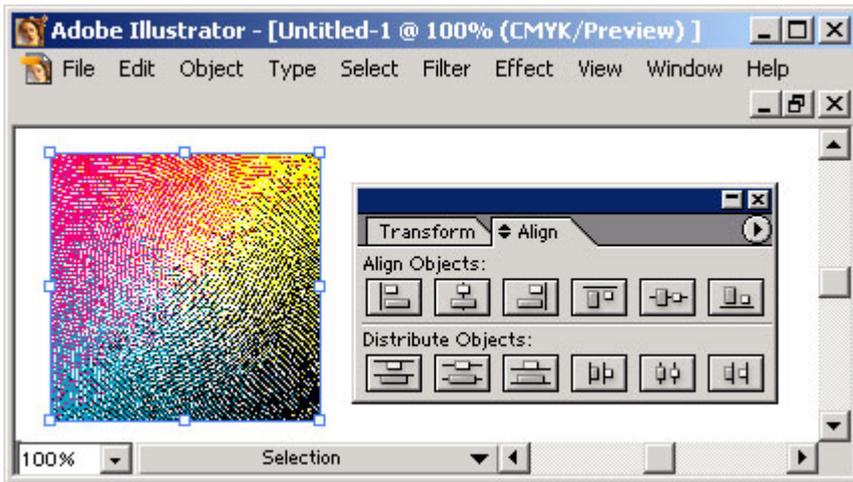
For each of the four images set an appropriate color of filling (Color: Cyan, Magenta, Yellow, Black). For the bottom image we set a white color of a line. For another three images a contour is transparent (none).



For the bottom image we set a normal transparency (Transparence - normal). For the rest three images a transparency is application (Transparence - multiply).



Align the images in relation to each other.

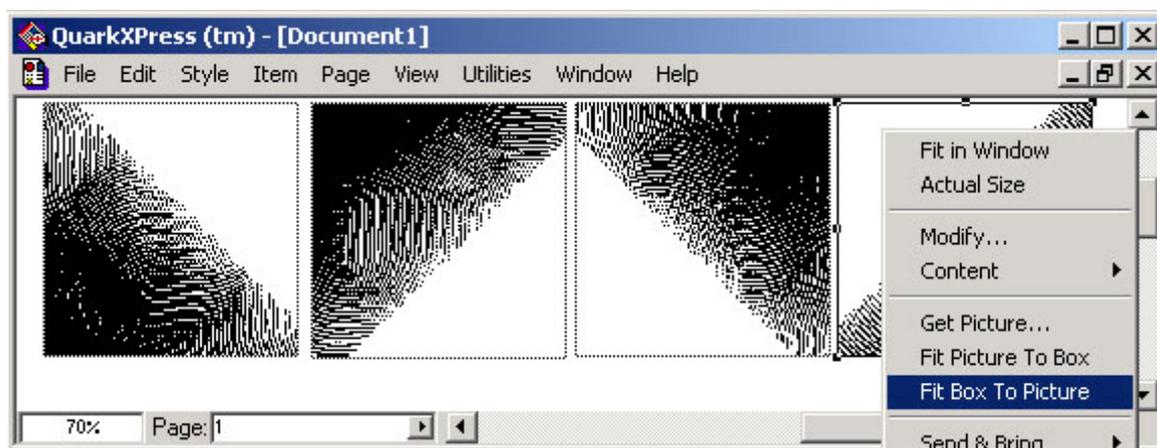


Important: it is impossible to change the sizes and the angle of inclination of images. In case of change of the sizes, the scale, proportions, positions or an angle of inclination of one or several colors, at printing of the image distortions of shades and moire may arise.

Group a composition of four layers and position it in the necessary place of a layout.

## Example of positioning the screened image in a layout of program QuarkXPress® 5.0

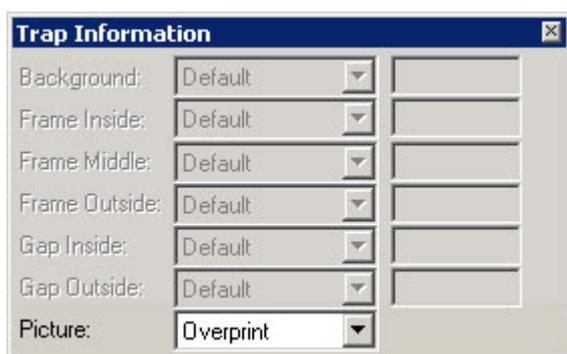
For positioning the color image create four identical graphic containers, in which four \*.tif files (for example: Out-C.tif, Out-M.tif, Out-Y.tif, Out-B.tif) generated by program BSS Designer® should be placed.



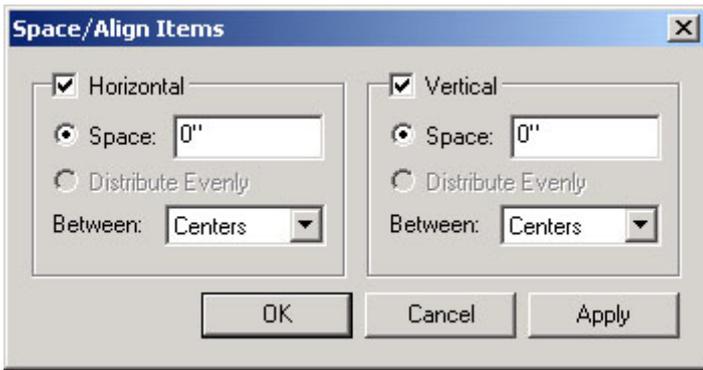
For each of the four images set an appropriate color (Cyan, Magenta, Yellow, Black).



For the first (bottom) graphic container set a white background, for the next three - colorless. For the top three images use an option "Overprint".



For all of the four containers set the identical coordinates and group them.



Now arrange a composition in the necessary place of a layout.



Important: it is impossible to change the sizes and the angle of inclination of images. In case of change of the sizes, the scale, proportions, positions or the angle of inclination of one or several colors, at printing of the image distortions of shades and moire may arise.

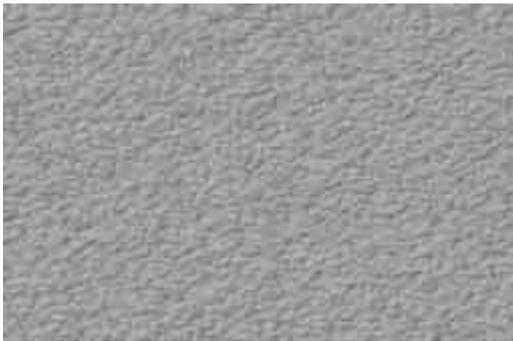
At generation of print-files set an appropriate value of the resolution and use an option "Full Resolution TIFF Output".

# Study lessons

## Lesson 1

Let's create an example of a simple background with the latent pattern which can be printed on the usual laser printer supporting the resolution 600 dpi.

1. Start the program BSS Designer®.
2. Specify a location of the screened image. Leave the resolution unchanged.
3. Do not specify the image "B", it will not be used.
4. Specify a location of the image "C". Choose the position "Multiply". Do not specify blurring.



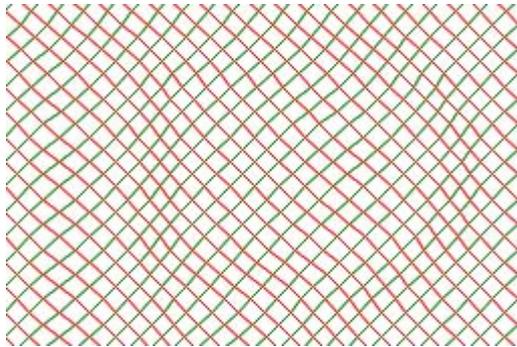
Screened image



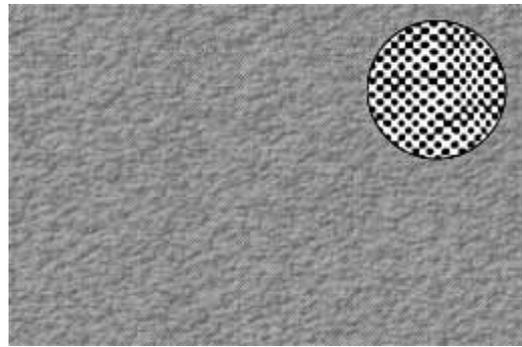
Additional image "C"

5. Pass to the menu "Parameters".
6. Establish the value of ruling 60 lpi.
7. Establish the value of the resolution 600 dpi.
8. Establish the angle of screening 45 degrees.
9. As the required dot gain compensation is not known, set the value 1.00.
10. In the menu "Dot Shape Modification" choose a mode "One Value". The raster is "Round".
11. In the menu "Deformation of Structure" choose a mode "Based on the Image C".

12. Set horizontal displacement – 0.75, vertical - 0.
13. Use an option "Blur Autoselect".
14. Pass to the menu "Generation".
15. Generate a map of a raster.
16. Generate the structure of a raster.
17. Specify the name and a location of a generated file.
18. Generate the screened image.



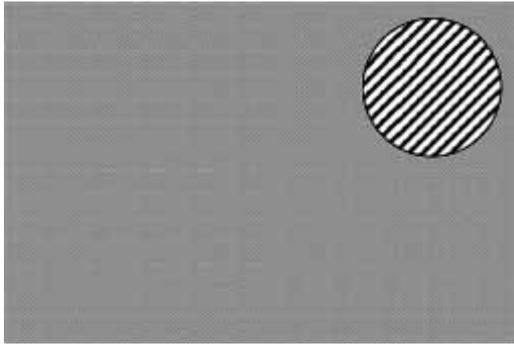
Fragment of geometrical structure



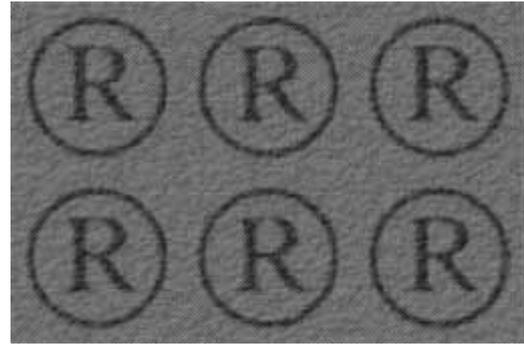
Generated raster

19. Save the parameters of the project in order to use them afterwards.
20. Set 40 % filling of a verifying grid.
21. Set the angle of a verifying grid 45 degrees.
22. Choose a mode "No Deformation ".
23. Specify a location and the name for a file of a verifying film.
24. Generate a verifying film.
25. Open the generated files or import them in any graphic editor.
26. Not changing the size and proportions of images, print the image of a background on the white paper, and a verifying film on the transparent tracing-paper.

27. Apply the tracing-paper on the image and check up the display of the latent pattern.



Verifying film



Display of the latent pattern

28. If you have become confused in the menu of program BSS Designer<sup>®</sup>, load a file of the project lesson\_1.mtj and verify your installations.

The list of applied files:

- A.tif - the basic screened image
- C.tif - the additional image "C"
- Out.tif - the generated raster of the basic image
- Net.tif - a file of a verifying film
- Lesson1.mtj - a file of the project with the saved installations
- Lesson1.html - a file of the present description

## Lesson 2

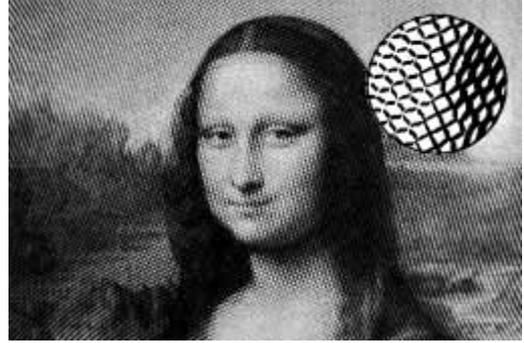
Let's create an example of a simple background with the use of decorative kinds of a raster, the change of structure of which is defined by the mathematical formula. The example is printed out on the usual laser printer supporting the resolution 600 dpi.

1. Start the program BSS Designer<sup>®</sup>.
2. Specify a location of the screened image. Leave the resolution unchanged.
3. Do not specify the image "B", it will not be used.
4. Do not specify the image "C", it will not be used.
5. Pass to the menu "Parameters".
6. Set the value of ruling 30 lpi.
7. Establish the value of the resolution 600 dpi.
8. Establish the angle of screening 0 degrees.
9. As the required dot gain compensation is not known, set the value 1.00.
10. In the menu "Dot Shape Modification" choose a mode "Based on the formula".
11. Set the formula for  $S = (A - 0.5) * 2$ . Rasters: "Double line" - "Rhombus" - "Double Bar".
12. In the menu "Deformation of Structure" choose a mode "Based on the formula".
13. Set the formula for  $dX = \cos(h * 3.14) * dpi / 2$ , for  $dY = -\cos(l * 3.14) * dpi / 2$ , the multiplication factor 1.00.
14. Pass to the menu "Generation".
15. Generate a map of a raster.
16. Generate the structure of a raster.
17. Specify the name and a location of a generated file.

18. Generate the screened image.



Screened image



Generated raster

19. Save the parameters of the project in order to use them afterwards.

20. Set 40 % filling of a verifying grid.

21. Set 0 degree angle of a verifying grid.

22. Choose a mode "Save Deformation".

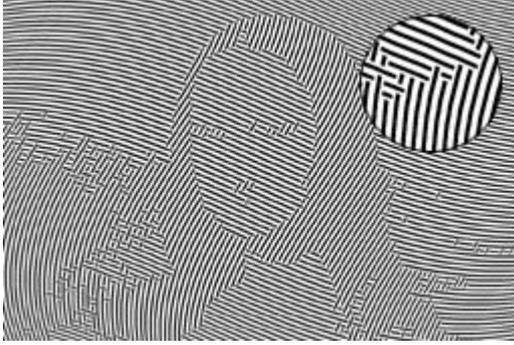
23. Specify a location and the name for a file of a verifying film.

24. Generate a verifying film.

25. Open the generated files or import them in any graphic editor.

26. Not changing the size and proportions of images, print the image of a background on the white paper, and a verifying film on the transparent tracing-paper. For printing use the laser printer in a mode 600 or 1200 dpi.

27. Apply the tracing-paper on the image and check up conformity of geometrical structures of a pattern.



Verifying film



Application of a film on the image

28. If you have become confused in the menu of program BSS Designer<sup>®</sup>, load a file of the project lesson\_2.mtj and verify your installations.

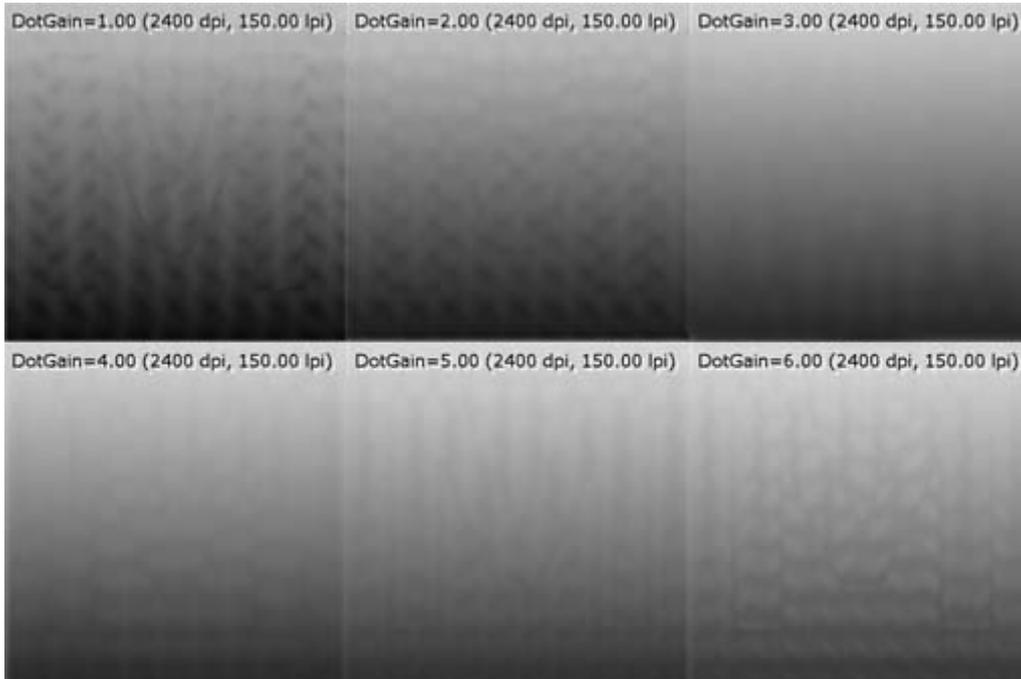
The list of applied files:

- A.tif - the basic screened image
- Out.tif - the generated raster of the basic image
- Net.tif - a file of a verifying film
- Lesson2.mtj - a file of the project with the kept installations
- Lesson2.html - a file of the present description

### **Lesson 3**

Let's define the value required for dot gain compensation at printing.

1. Start the program BSS Designer®.
2. Pass to the menu "Parameters".
3. Set the value of ruling 150 lpi.
4. Set the value of the resolution 2400 dpi.
5. Set the angle of screening 45 degrees.
6. Pass to the menu "Generation".
7. In the menu "Dot Gain Test" set the initial value 1.0, a step 1.0, and the final value 6.0.
8. Generate the tests.
9. Import the generated files into any graphic editor and arrange them on one sheet. The imported images cannot be compressed or dragged out.
10. Generate a print-file for production of a photopositive or a typographic plate. At generation it is impossible to use an option of automatic reduction of the resolution of images.
11. Print the tests by the offset machine, using different grades of paper. Watch the observance of all technological processes.



Printed tests for determination of required dot gain compensation

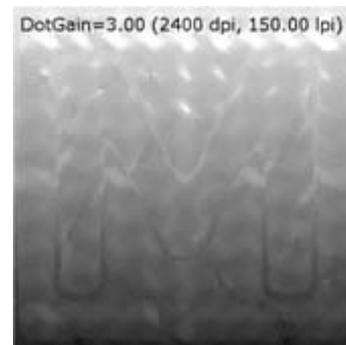
12. Note the positions with the smoothest background on the printed samples. The stains and the letter "M" should not be appreciable.

13. In further work use the values of dot gain compensation specified on the marked positions.

14. Repeat the tests if there were any changes in the production chain (change of the equipment or materials).



Correctly chosen value of compensation



Badly adjusted manufacturing technology

- The function "Dot Gain Compensation" cannot compensate for the light-shortening of the fine halftone dots, therefore it is necessary to watch for the gauging of the exposing and developing machines. Do not use too high values of ruling LPI and typographic plates of poor quality.
- The deviation from the required value of compensation will not be as appreciable at usual works as on the printed tests.
- In offset printing the quality of the image depends on the gauging of the device for the production of photopositives or plates (thus the established linearization has no value, it is desirable that the device being used would demand minimal linearization), on the type of materials used (we recommend a film of Hard Dot class and high-quality typographic plates), on the adjustment and technical condition of a press (ink feed, tightness of cylinders, humidifying, replacement of wearing elements).

## Lesson 4

Let's create an example of full-color images for offset printing.

For the given example we will prepare three images:

The image "A" - the basic image in color format CMYK, in the right bottom corner of which the microtext is located;



Screened image



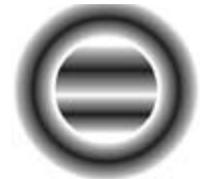
Microtext on the image

The image "B" will determine the change of the kinds of a raster in the final composition;

The image "C" is for introduction of geometrical distortions into the structure of a raster.



Additional image "B"



Additional image "C"

1. Start the program BSS Designer®.
2. Specify a location of the screened image. Leave the resolution unchanged.

3. Specify a location of the image "B". Choose the position "Stretch". Blurring - 2.
4. Specify a location of the image "C". Choose the position "Stretch". Do not specify blurring.
5. Pass to the menu "Parameters".
6. Set the value of ruling 133 lpi.
7. Set the value of the resolution 2400 dpi.
8. Set the angles of screening "Shades of Green".
9. Dot gain compensation- 3.00.
10. In the menu "Dot Shape Modification" choose a mode "Based on the Image B". Rasters: "Bar" - "Round" - "Line".
11. In the menu "Deformation of Structure" choose a mode "Based on the Image C".
12. Set horizontal displacement 1.00, vertical - 0.50.
13. Use an option "Blur Autoselect".
14. Pass to the menu "Generation".
15. Generate a map of a raster.
16. Generate the structure of a raster.
17. Specify the name and a location of the screened files.
18. Generate the screened image.
19. Set 40 % filling of a verifying grid.
20. The deformation of structure of a raster is carried out on a background of the sky with the average value of color: Cyan-100, Magenta-50, Yellow-0, Black-0 %, therefore set the angle of a verifying grid of 75 degrees, appropriate to the color Magenta.
21. Choose a mode "No Deformation".
22. Specify a location and the name for a file of a verifying film.

23. Generate a verifying film.
24. Save the parameters of the project in order to use them afterwards.
25. Import four generated files of rasters for the color image into the graphic editor (Corel Draw, Adobe Illustrator, Macromedia Freehand, Quark X-press, Adobe Pagemaker or another).
26. For a raster Cyan set the filling 100 % cyan, a white background, and position it under the rasters Magenta, Yellow, Black.
27. For the rasters Magenta, Yellow, Black set an appropriate 100 % filling with an option "Overprint" and a transparent background.
28. Align four images in relation to each other and group them.
29. Not changing the proportions position the created composition in the necessary place of a layout.
30. Generate a print-file for offset printing. Print the production.
31. Produce a verifying film on a separate photopositive.
32. Check up the display of the latent pattern on the printed sample at the application of a verifying film.



Printed image



Display of the latent pattern at the application of a verifying film

33. If you have become confused in the menu of program BSS Designer<sup>®</sup>, load a file of the project lesson\_4.mtj and verify your installations.

- The values dpi and of dot gain compensation defined in the example may not suit your conditions of printing.

The list of applied files:

- A.tif - the basic screened image
- B.tif - the additional image "B"
- C.tif - the additional image "C"
- Out-C.tif - the generated raster for color Cyan
- Out-M.tif - the generated raster for color Magenta
- Out-Y.tif - the generated raster for color Yellow
- Out-B.tif - the generated raster for color Black
- Net.tif - a file of a verifying film
- Lesson4.mtj - a file of the project with the saved installations
- Lesson4.html - a file of the present description

## Lesson 5

Let's create an example of the monophonic image for offset printing with two latent images. For the given example we will prepare three images:

The image "A" - the basic image in color format Grayscale;



Screened image

The images "B" and "C" will determine geometrical distortions in the structure of a raster



Additional image "B"



Additional image "C"

1. Start the program BSS Designer®.
2. Specify a location of the screened image. Leave the resolution unchanged.
3. Specify a location of the image "B". Choose the position "Stretch". Blurring - 1.
4. Specify a location of the image "C". Choose the position "Stretch". Blurring - 1.

5. Pass to the menu "Parameters".
6. Set the value of ruling 133 LPI.
7. Set the value of the resolution 2400 DPI.
8. Set the angle of screening 45 degrees (at this value it will be possible not only to turn a verifying film through 90 degrees for display of the second latent image, but also just to turn it to the other side).
9. Dot gain compensation - 3.00.
10. In the menu "Dot Shape Modification" choose a mode "One Value". A raster - "Round" (for transfer of two latent images other kinds of rasters are not suitable).
11. In the menu "Deformation of Structure" choose a mode "Base on the formula".
12. Set the formula for  $dX = B+C$ , for  $dY = B-C$ , the multiplication factor 6.00. (the mark "+" or "-" in the mathematical formula before a variable of the additional image sets a direction of displacement, for the second image the direction should be perpendicular in relation to the first additional image and to an angle of screening. The value of multiplication factor is connected to the relation  $DPI/LPI$ , and for the angle of screening 45 degrees it is calculated by the formula  $DPI/LPI/3$ )
13. Do not use an option "Blur Autoselect".
14. Pass to the menu "Generate".
15. Generate a map of a raster.
16. Generate the structure of a raster.
17. Specify the name and a location of the generated files.
18. Generate the screened image.
19. Set 50 % filling of a verifying grid.
20. Set the angle of a verifying grid of 45 degrees.
21. Choose a mode "No Deformation".

- 22. Specify a location and the name for a file of a verifying film.
- 23. Generate a verifying film.
- 24. Save the parameters of the project in order to use them afterwards.
- 25. Open the generated files or import them into any graphic editor.
- 26. Generate a print-file for offset printing. Print the image using orange inks.



Printed image

- 27. Produce a verifying film on a separate photopositive.
- 28. Check up the display of the latent images on the printed sample at the application of a verifying film by the obverse and reverse side.



Display of the latent pattern at the application of a verifying film

Display of the latent pattern at the application of a verifying film by the reverse side

- 29. If you have become confused in the menu of program BSS Designer<sup>®</sup>, load a file of the project lesson\_5.mtj and verify your installations.

- The values DPI and of dot gain compensation defined in the example may not suit your conditions of printing.

The list of applied files:

- A.tif - the basic screened image
- B.tif - the additional image "B"
- C.tif - the additional image "C"
- Out.tif - the generated raster of the basic image
- Net.tif - a file of a verifying film
- Lesson5.mtj - a file of the project with the saved installations
- Lesson5.html - a file of the present description