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User's Manual of Double Heads Linkage Of The Laser Controller

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RD Co., Ltd.

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1 Overview

1.1 Briefing

The laser engraving/cutting control system developed by RuiDa Technology Co. Ltd., some models have the function of double heads linkage, In this paper, the structure of the double heads machine, the controller connection mode, and the operation methods are discussed in detail.

All controllers support double heads linkage can be switched between double heads linkage control and conventional control.

1.2 What is double heads linkage

Double heads shift machine is a machine with two laser heads, and the relative distance between the two laser heads can be adjusted by the controller. This kind of machine processes N array of graphics by two linked laser heads when cutting/scanning virtual array graphics. Assume that N is equal to 10 columns, the controller will intelligently adjust two laser spacing according to the width of each column graphics, and each laser head will point to the starting position of one of the columns, then the controller finishes processing 10 columns graphics. If the laser head 1 processes five columns, then laser 2 will process five columns too, if the laser 1 processes six columns, laser 2 will process four columns, and so on, finally, the spacing between each of the 10 columns graphics is the same.

But, for two ordinary double laser machines, the distance between the fixed two laser heads cannot be intelligently adjust by the controller, the middle part of the material can produce some different sizes of waste blank depending on the processing graphics, at that time, users can manually adjust the spacing between the two heads before processing, but this is a fussy work and the spacing is not accurate.

From this we can see that the two laser heads linkage machines can synergy complete array of graphics processing, this not only saves processing time, but also reduces the losses of materials to a minimum.

1.3 The structure of double head linkage machine

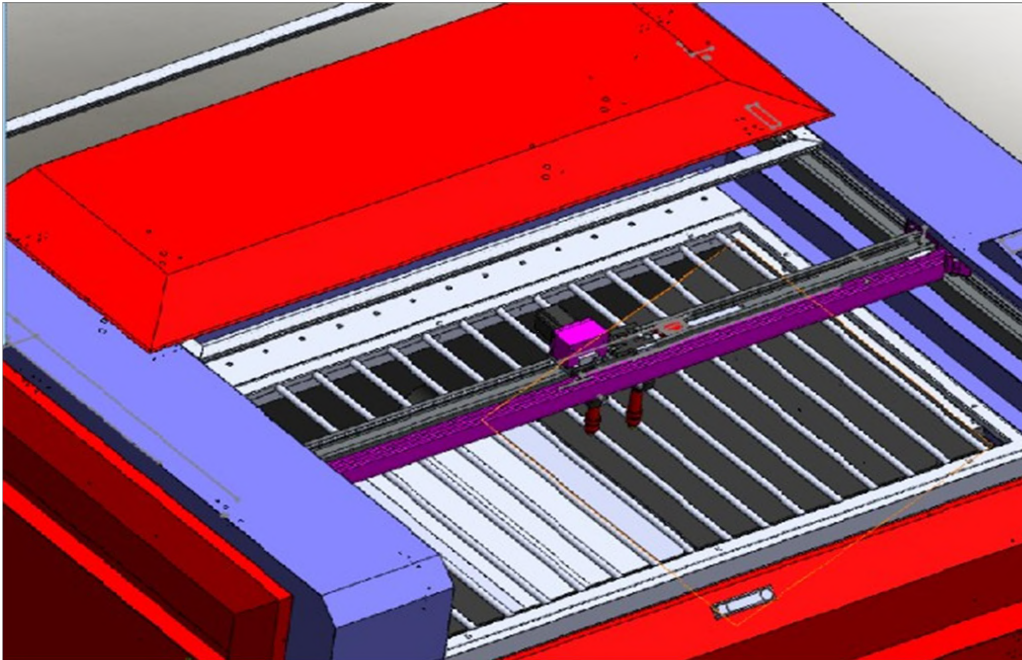


Figure 1-1

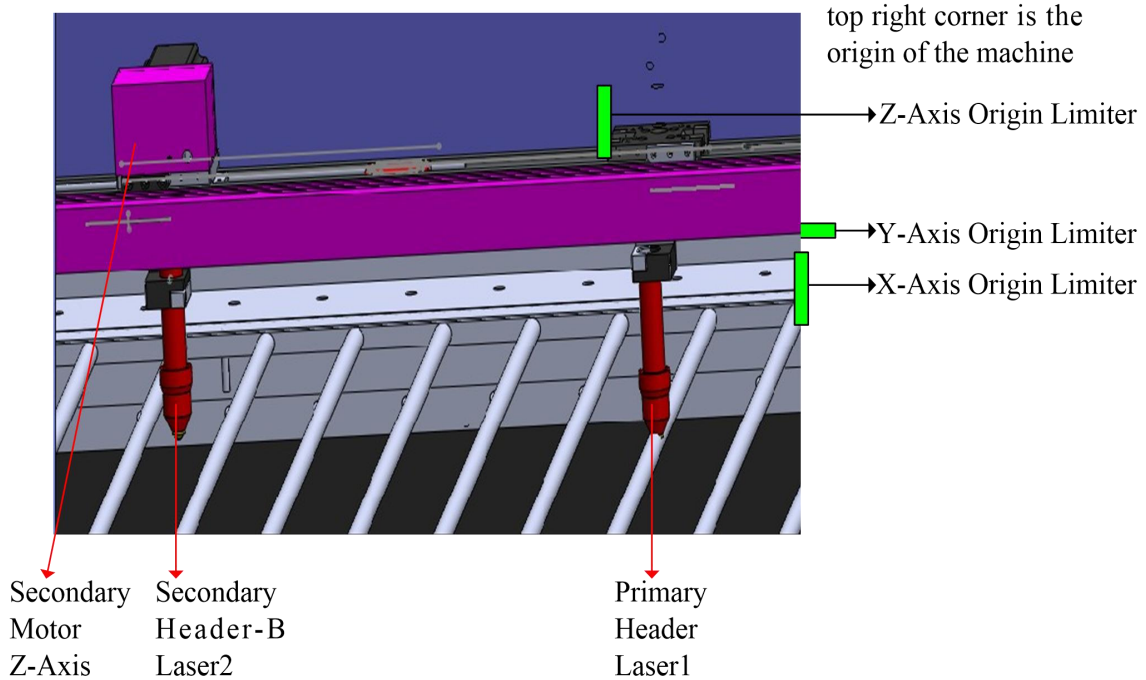


Figure 1-2

For the above machine's structure, the origin of the machine is in the top right corner, and x and y axis will go back to the top right corner to look for their origin limiter when system is resetting, then Z axis will go to the right corner to find the origin of the Z axis. Among them, the main laser head is for a

name A, the auxiliary laser head is for a name B. Head B can be moved alone in any time, at this time A laser will not move; But if users move head A in any time, head B will also move.

Head A must be connected to the first laser control port all the way, to control opening or closing of Laser1, and its movement is driven by X axis driver interface; Auxiliary head B must be connected to the second laser control port Laser2, and its movement is controlled by Z axis driver interface, if the electric connection is not correct, there will produce some error in the processed graphics.

1.4 The electric connection

The electric connection for double head linkage controller is shown as below. For more detail such as the various motor driver connections, the laser control interface, and the layout of the controller pin arrangement etc., please check the manual of the specific model of RuiDa company's products.

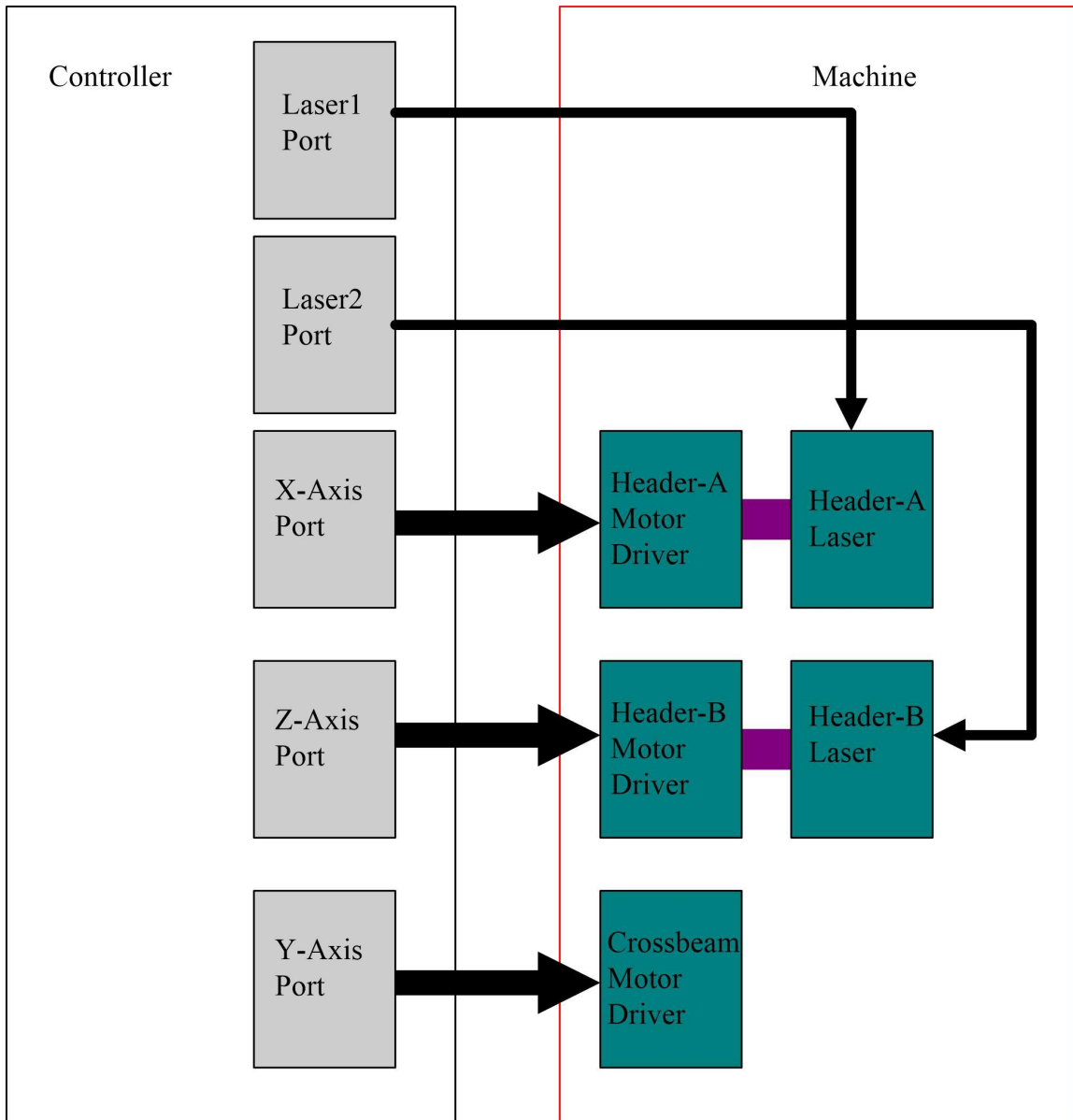
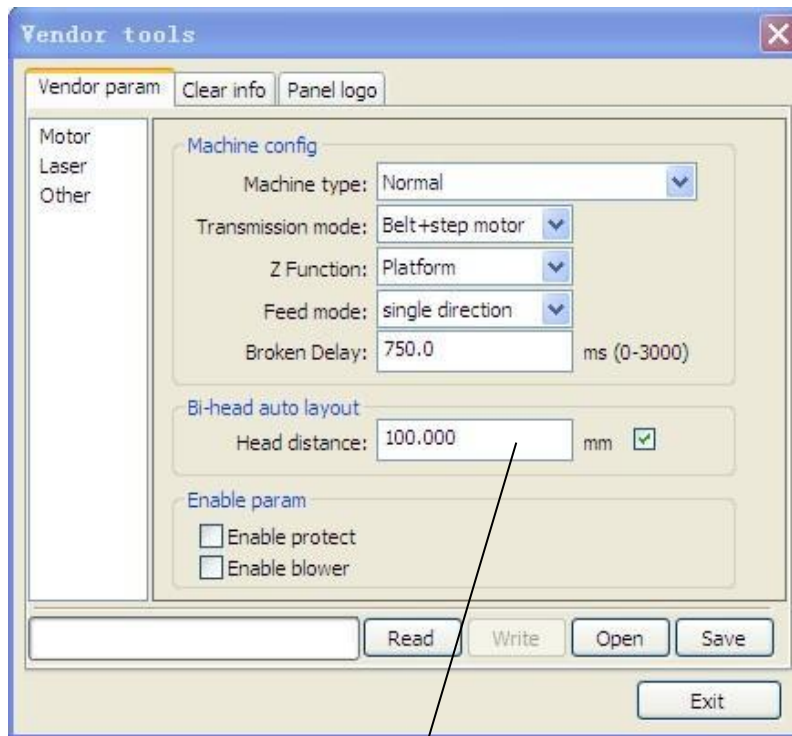


Figure 1-3

2 operating instructions

2.1 Function selecting for double head linkage



Select and set the value

Figure 2-1

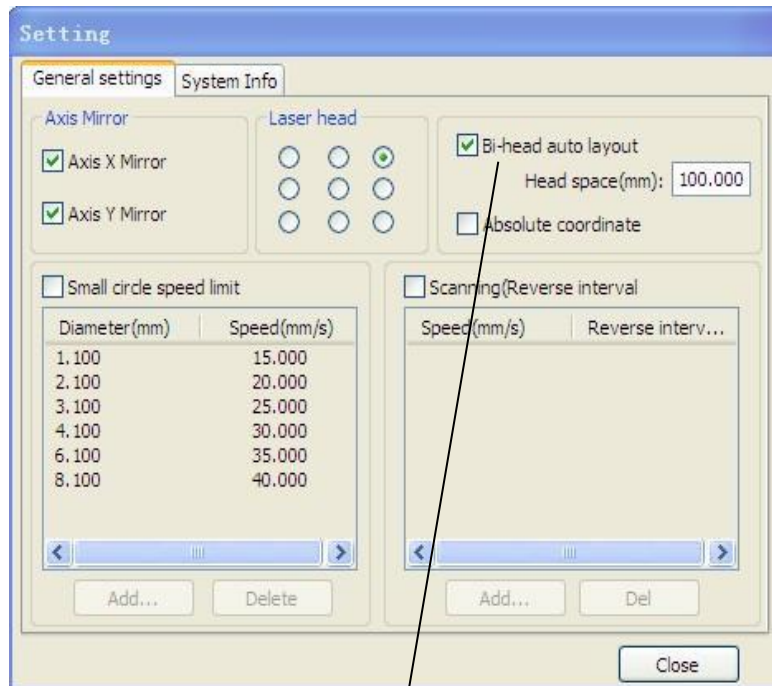
Please click on the PC software: file - > Vendor Settings - >, after enter the password to enter the manufacture parameter settings interface, firstly, read the parameters, then click on the “other parameters” in the factory parameters, the pop-up menu will show as figure 2-1. In “Bi-head auto layout” item, when the box of “Head distance” is not checked, the spacing value will be gray and can’t be set, only after the box is selected, the head distance can be set up.

In general, the origin limiter of head B is near to head A. Head B will approach to head A until it meets his limiter after XY axis have all meet their limiters, head A and B can't approach more closely at that time, then, the minimum spacing between them is fixed, and it is inevitable when machine is designed, users should accurately measure the spacing value, and then fill it in the above parameters box. If the spacing value is not accurate, there will produce some inaccurate gap in the processed graphics. In general, only one time you need to set the value, unless there is a moving for limiter switch location.

After the box of “Head distance” is checked and the spacing value is set up, users will click on “write” button, in this way, the controller’s double head linkage function will be enabled. On the other hand, if the box is not selected when writing parameter, this function is not enabled.

In addition, click on the PC software menu - > Config -> system setting - > General settings, it

will pop up the interface shown as figure 2-2, there is also a " Bi-head auto layout " item on the interface, If do not select it, the spacing value will be gray and can't be set up, if the box is selected and then the value can be set, pay attention to that this value is only useful when drawing a virtual array graphics to automatically bestrew breadth. PC software will finish automatically bestrewing breadth according to the paper's size and whether there is a double heads linkage function. If we do not use the function of automatically bestrewing breadth, it is irrelevant that the parameter is checked or not. And, this parameter is clicked whether or not does not affect the controller has the function of double heads linkage, to enable or disable the double heads linkage function, it must be checked in the interface of the foregoing figure 2-1.



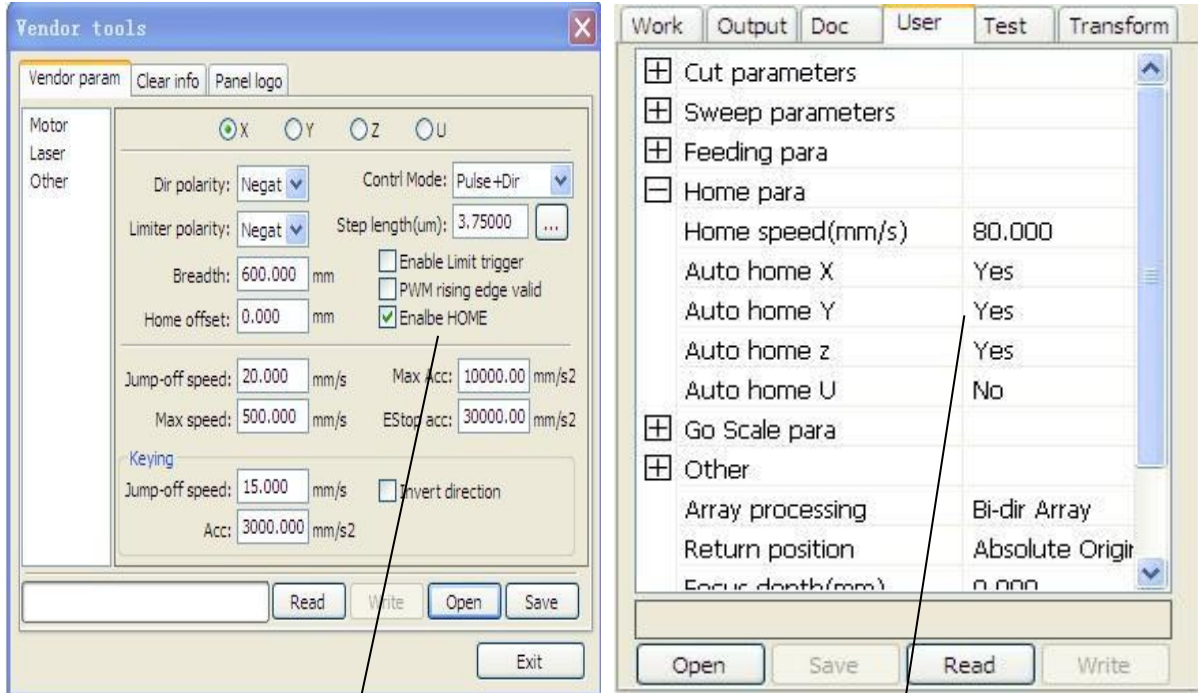
Select and set the value

Figure 2-2

2.2 Reliable resetting

If the controller is enabled with the function of double heads linkage, XYZ axis "Enable home" and "Auto home" functions must be enabled at the same time, this let the XYZ axis reliably reset to their home to find the origin limiters when power on. After XY axis have looked for the origin, the Z axis, that's to say the head B, will move to head A to look for his origin.

The factory parameters are shown as figure 2-3, the user parameters are shown as figure 2-4, in these figures, please select the "Enable Home" items and select the "Auto home XYZ" items to "Yes".



Enable Home in Factory Para.
Figure 2-3

Enable XYZ Auto Home in User Para.
Figure 2-4

2.3 The maximum breadth of XZ axis

The maximum breadth of X and Z axis should be the same, it should be set to the same value. After set the accurate breadth, when moving X axis (head A) or Z axis (head B), there will not be any collision (all of head A and B will not collide to the edge of the machine, and, head A and B will not collide with each other).

As shown in the figure 2-5 below, the maximum breadth of the machine is 2 meters for X axis and Z axis, assuming that the minimum spacing between head A and B is 100 millimeter, the machine can cut the largest 2.1 meters of graphics.

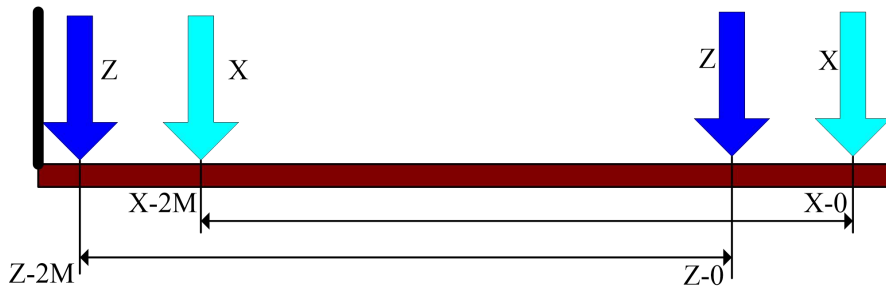


Figure 2-5

2.4 Z Axis Stop position instructions

To save the processing time, after running a work, Z axis (head B) no longer went back to his origin, that is to say, the relative position of head A and B no longer changed after finishing a work. The next time when starting a work, if it is the same graphics, the head B no longer separated, if it is a different work, head B will redistribute the right position.

3 Introductions to all kinds of virtual array graphics

Assuming that the maximum breadth of X/Z axis is 2 meters, and the minimum spacing between A and B head is 100.00 mm.

3.1 Graph one

The total width of the whole virtual array graphics is less than 100 mm, and the location of the graphics is not beyond 2 meters, then all the graphics will be done by A head.

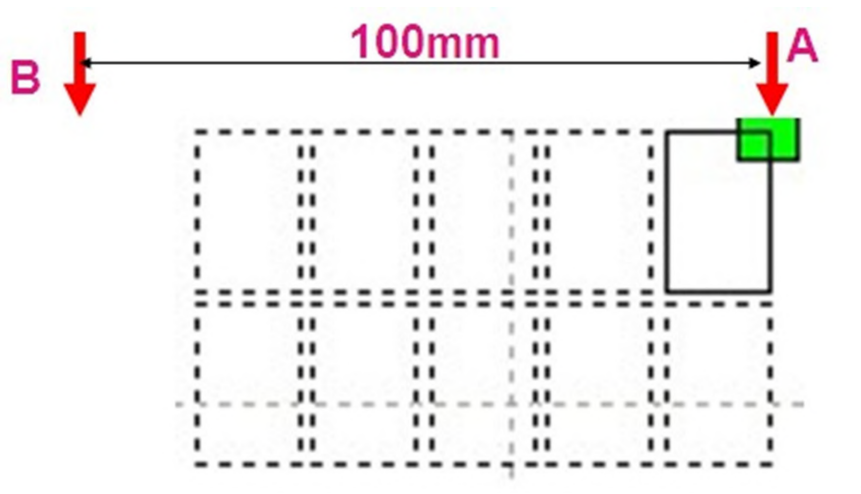


Figure 3 -1

3.2 Graph two

The total width of the whole virtual array graphics is beyond 100 mm, but the width of a single column graphics is less than 100 mm, then the whole graphics is cut together by head A and B.

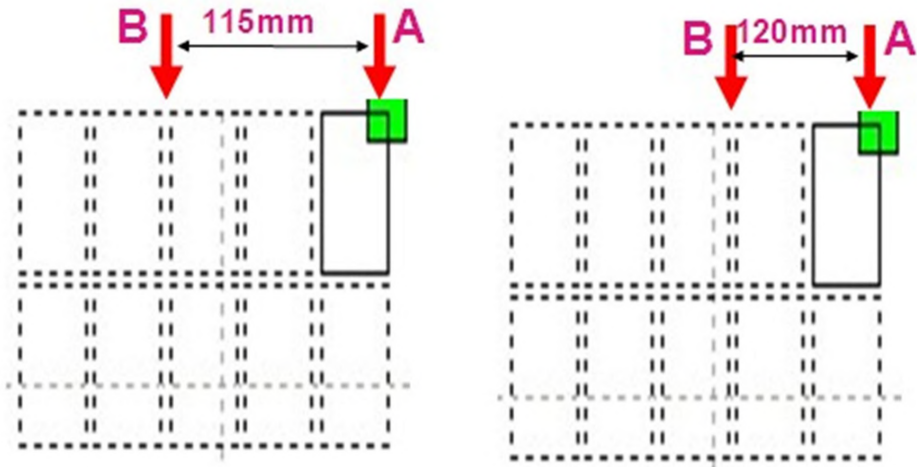


Figure 3-2

3.3 Graph three

The position of the whole virtual graphics is in the scope between 2 meters and 2.1 meters, and then all the graphics will be cut by head B.

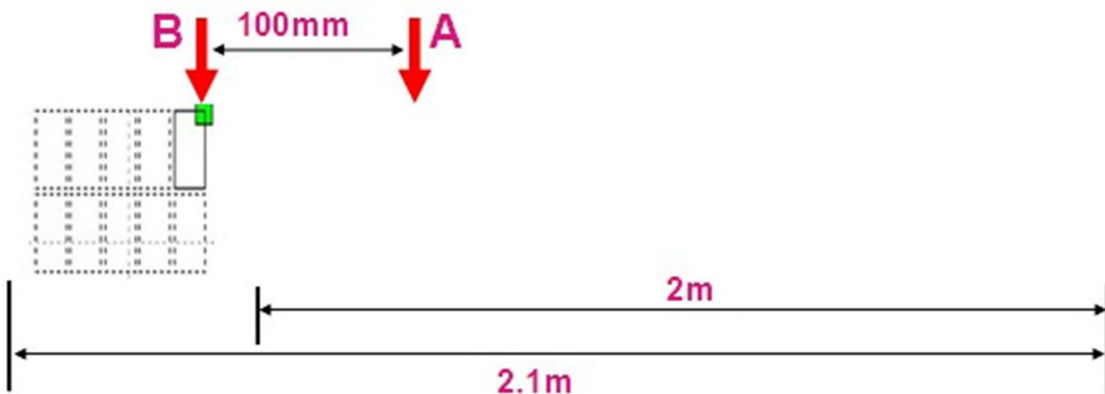


Figure 3-3

3.4 Multiple virtual array graphics

As shown in the figure below, the first virtual array graphics is the ellipse, the second is the rectangle, to that graphics, the controller will process each virtual array using the cooperative head A and B, ellipse array will be processed firstly, then is the rectangle array, every time before the collaborative processing, the controller will automatically adjust the spacing between head A and B.

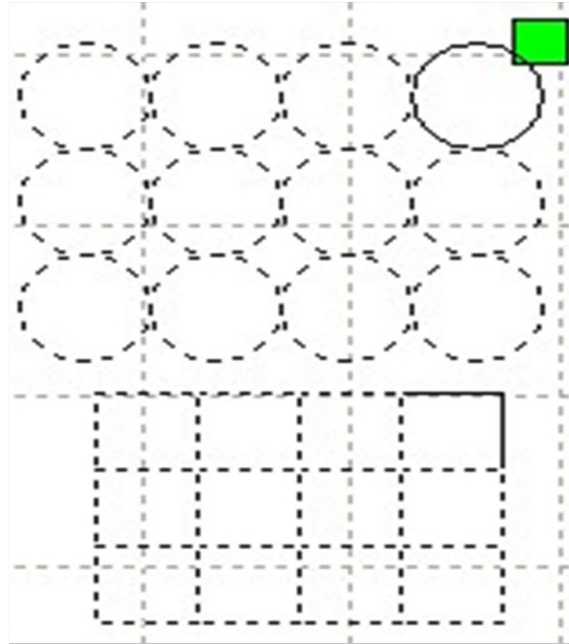


Figure 3-4

3.5 The dislocation array

Dislocation array can make each figure arranged compactly on the processing material, this can save materials in a good way.

As shown in the figure below, it is the result of an elliptical dislocation virtual array, there is a 15 mm dislocation in X negative direction for even line, in this way, the second line graphics can be moved up 4 mm without causing overlap (The spacing of Y direction is set to -4 mm), so that the total height of the two lines ellipse decreased by 4 mm, this finally saved the processing materials.

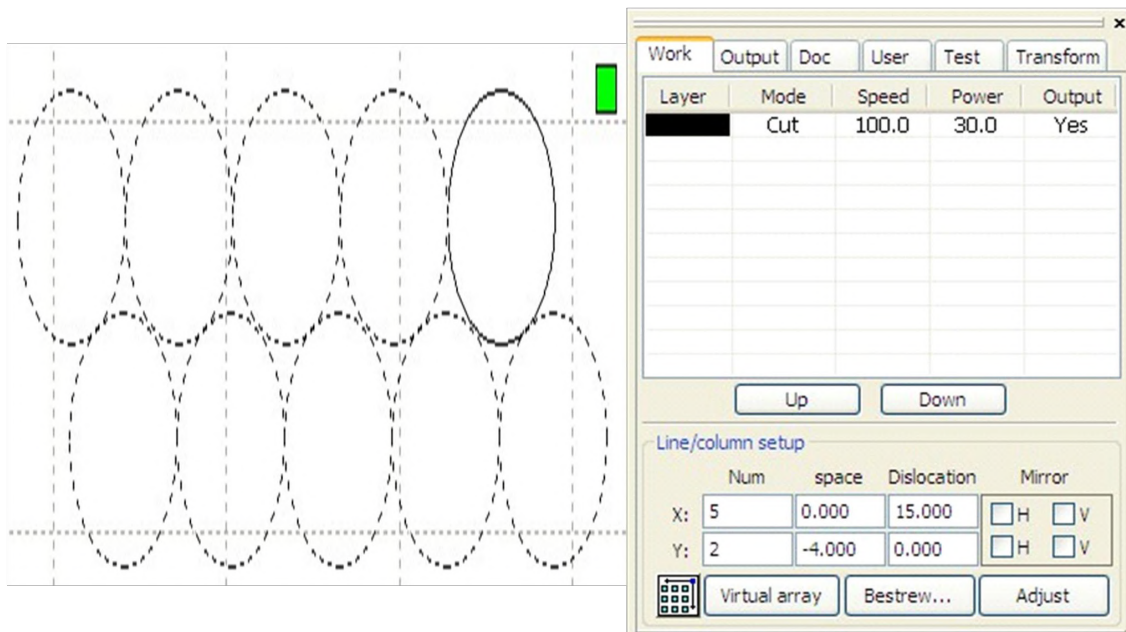


Figure 3-5

3.6 Mirror array

Mirror array, like the dislocation array, also can make each figure arranged compactly on the processing material, this also can save materials in a good way.

As shown in figure 3-7, the even column figure is set a mirror function in the vertical direction, so that it can be set minus 15 mm intervals in X direction without causing any overlap, after compressing in X direction, the total width of the whole graphics is reduced greatly, thus also greatly saved the materials.

In addition, the dislocation array and the mirror array functions can be used at the same time, to maximize savings processing materials.

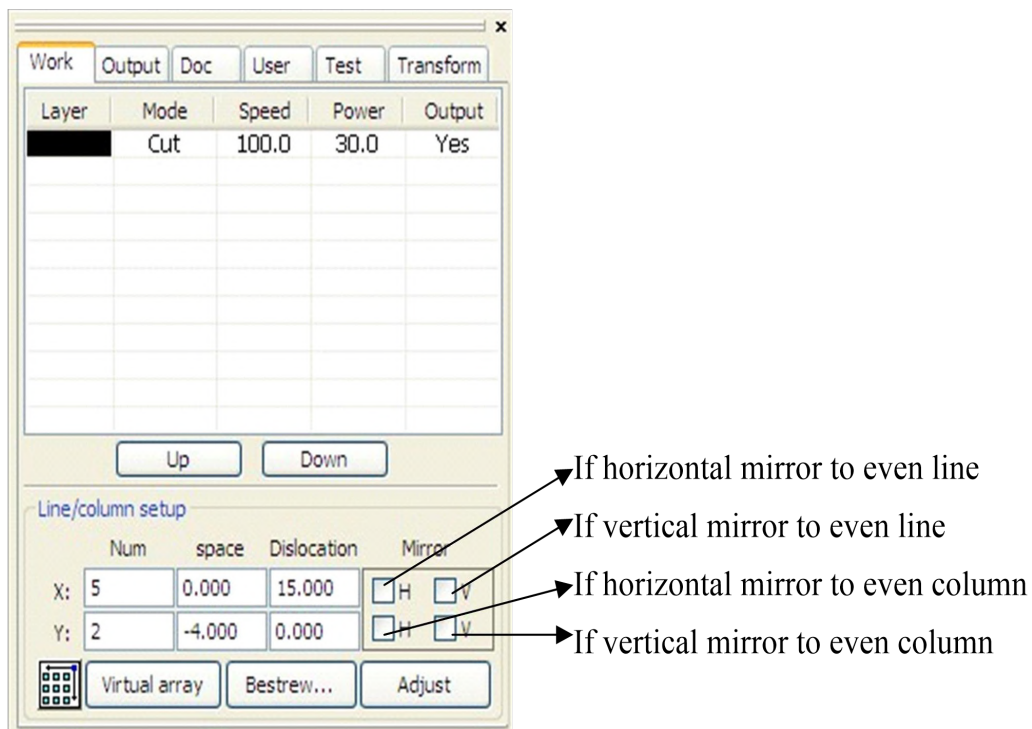


Figure 3-6

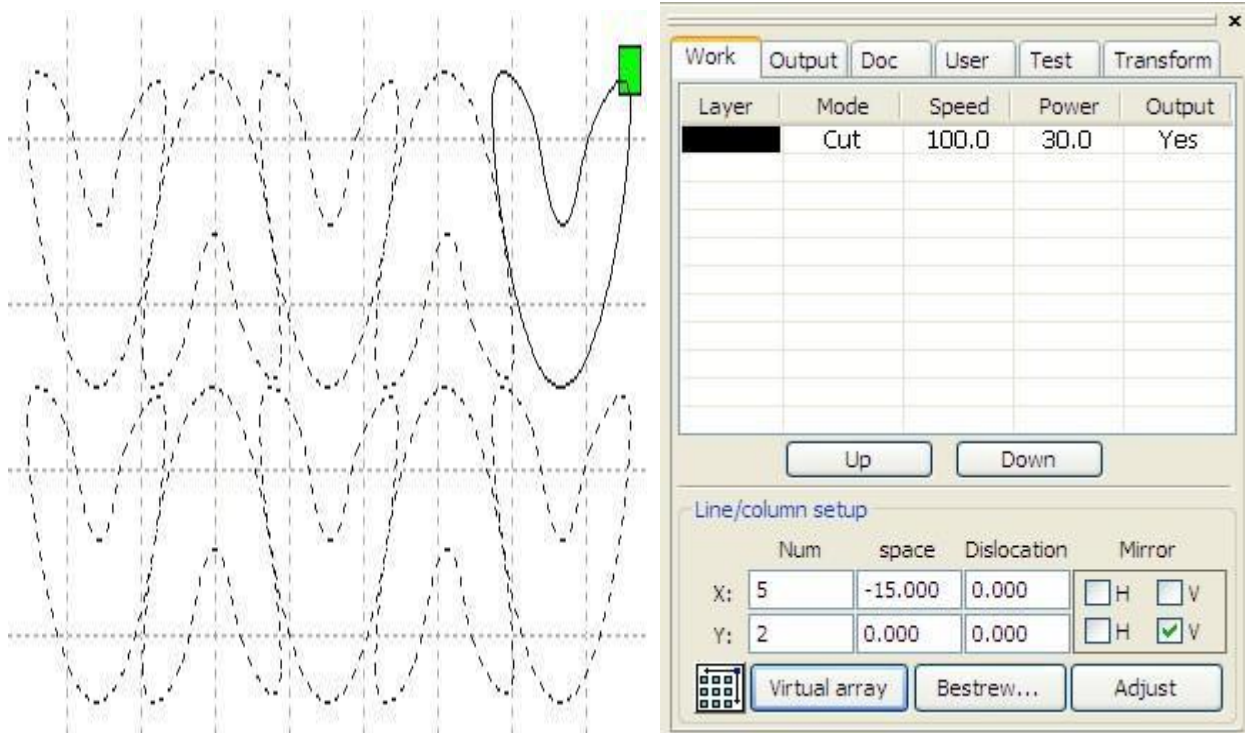


Figure 3-7

3.7 Leftover material cutting

Due to the difference of a specific array graphics, in some processing materials with the known width, there may not be able to fully use the entire materials, this caused some waste of the material, at this point, the extra space in material is available to cut some expect graphics alone.

As shown in the figure below, in the processing materials with the width 2.1m, after cutting two big virtual array graphics (virtual array 1 and 2), there have some spare parts in the left, middle and the right of the material, at this point some different small graphics (leftover materials) can be put in those spare parts respectively, thus can well save the materials.

It is important to note that for the leftover material 1, 2 and 3 as shown in figure 3-8, users must select leftover material 1, 2 and 3 respectively, and then set the line and column all to 1 to virtually array respectively, if do not operate like this, the PC software will think the leftover material 1, 2 and 3 as a whole graphics, then the width of the single graphics is more than the maximum 2 meters, this graphics can't be cut using head A or (and) B. Therefore, users must select one of the three methods:

- (1) Leftover material 1, 2 and 3 is virtually arrayed respectively in 1 line and 1 column;
- (2) Leftover material 1 and 2 can be virtually arrayed in 1 line and 1 column as a whole graphics, and then leftover material 3 separately arrayed in 1 line 1 column;
- (3) Leftover material 2 and 3 can be virtually arrayed in 1 line and 1 column as a whole graphics, and then leftover material 1 separately arrayed in 1 line 1 column;

After doing the above work, virtual array 1 and virtual array 2 will be processed by head A and B with the collaboration, and leftover material 1, 2 and 3 will be separately processed by head A or B.

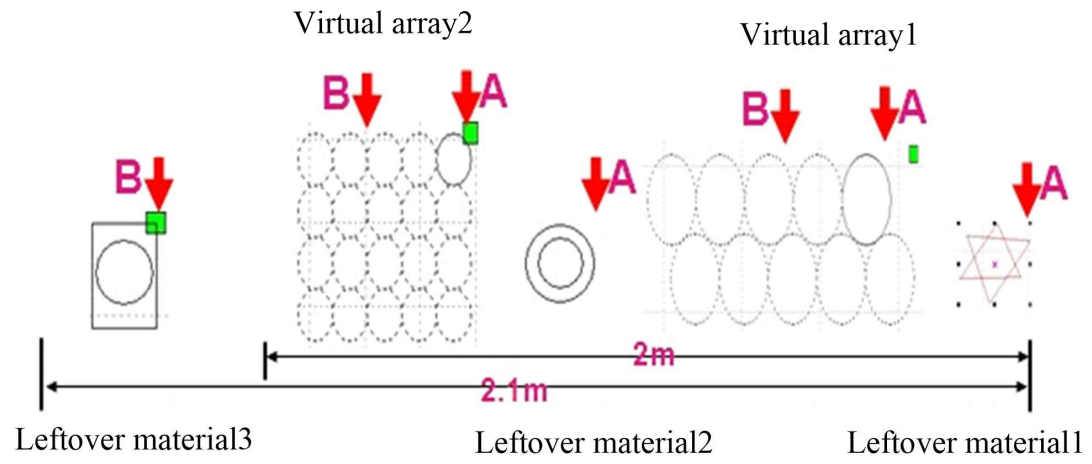


Figure 3-8