

Datapath X4

Configuration Setup Guide



Contents

Glossary of Terms.....	3
Introduction.....	4
Equipment Required	4
General Setup.....	4
2x2 Video Wall Configuration.....	5
Top and Left Measurements.....	6
<i>Region 1</i>	6
<i>Region 2</i>	6
<i>Region 3</i>	7
<i>Region 4</i>	7
Summary of the Calculations - 2 x 2 Display Wall.....	8
Windmill Configuration.....	9
Monitor Rotation.....	9
Calculations for the Windmill Configuration.....	10
<i>Region 1</i>	10
<i>Region 2</i>	11
<i>Region 3</i>	12
<i>Region 4</i>	13
Summary of the Calculations - Windmill Display Wall.....	14

Glossary of Terms

Resolution

Quoted as width × height, with the units in pixels: for example, “1920 × 1080” means the width is 1920 pixels and the height is 1080 lines.

Refresh Rate

The refresh rate (in Hz or frames per second) is the number of times in a second that a display hardware draws the data

Pixel Clock

The pixel clock frequency, measured in MHz determines the rate pixels are acquired.

Source

The equipment used to produce the video for capture

Bezel

The outside frame area around the monitor display area

Active Screen Area

The part of the monitor which displays the content

Capture region

A user defined area of the source video

EDID Preferred Mode

Extended display identification data (EDID) is a data structure provided by a digital display to describe its capabilities to a video source. The preferred mode is the display informing the video source what it prefers to show, i.e. the display’s native resolution.

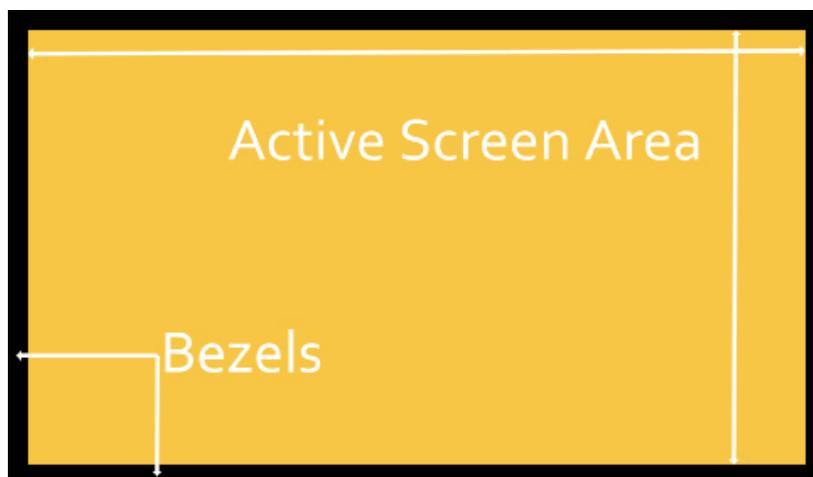


Fig.1

Introduction

The aim of this configuration setup guide is to provide you with the basic knowledge of our x4 software functionality and explain how to setup and program your video wall.

The Datapath x4 is a multi-display controller allowing customers to arbitrarily scale, rotate and crop their input content to each of the four outputs.

The x4 is a very flexible display controller and not all possible configurations can be documented within this setup guide, however the principles are the same for all configurations.

The x4 is designed to capture areas of the source canvas (video) and display those areas on the display monitors, a good example of this can be seen in Fig.5 on page 9. The green area is the source canvas and the yellow areas depict the monitor configuration, covering the area of the source to be captured.

Throughout this setup guide the source video is referred to as standard wide screen resolution of 1920 horizontal pixels x 1080 lines. If your video source is different from 1920 x 1080 then substitute the figures accordingly.

The measurements given in this guide for the monitors are an example only and should be substituted with the dimensions of the actual monitors in use.

Equipment Required

- A set up PC with the x4 application installed (this can be the source of the video)
- Calculator
- Tape measure
- Monitor manufacturer's line drawing. (Optional)

General Setup

Ensure your monitors are in place and fastened securely. Connect all four screens to the x4 DVI-I output connectors on the rear of the x4 (see x4 User Manual).

When configuring the x4, you must ensure that the x4 unit is powered and that the USB cable is connected. Ideally the input should be connected so the cropping and scaling settings are associated with the correct input canvas resolution. With no signal connected, the canvas size is assumed to be the preferred mode that has been programmed into the input EDID.

Connect the setup PC to the x4 using the USB cable provided and open the x4 application .

2x2 Video Wall Configuration

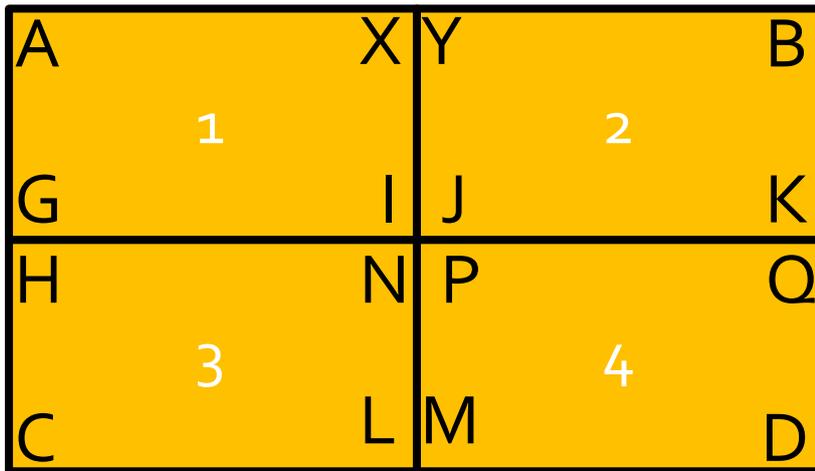


Fig.2

The first calculation required is the width, in pixels, of the active screen area of a single monitor, In this example it is assumed that the entire input video is to be stretched across the entire regions:

Using a tape measure, measure the distance from A to B but only the active screen area, i.e. do not include the outer bezels.

In this example A to B = 1500mm

Measure the active screen area between A and X

In this example A to X = 730mm.

Calculate the following:

The distance between A to X (730mm) divided by the distance between A to B (1500mm) multiplied by the source width in pixels (1920).

$$(730 \div 1500) \times 1920 = 934$$

In the x4 application on the setup PC, click on the Modify button for the Input Capture Regions and input the number 934 as the Width in the following dialogue:

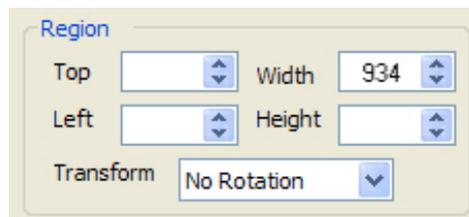


Fig.3

In this example, since all four monitors are identical, this value can also be used for the remaining three monitors.

To calculate the height, in pixels, of the active screen area of the monitors:

Measure the distance from A to C but only the active screen area, i.e. do not include the outer bezels.

In this example A to C = 900mm.

Measure the active screen area between A and G

In this example A to G = 448mm.

Calculate the following:

The distance between A to G (448mm) divided by the distance between A to C (900mm) multiplied by the source height (1080).

$$(448 \div 900) \times 1080 = 538$$

Input the number 538 as the Height for each region.

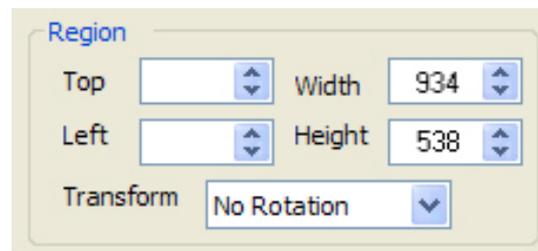


Fig.4

Top and Left Measurements

The Top and Left dimensions determine where each region is placed over the source canvas. As in all computer graphics applications, the top left corner is taken to be the origin. (0,0)

Region 1

In this configuration, monitor 1 (Region 1) is displaying the top left of the source canvas, therefore Top should be zero and Left should also be zero.

Enter zero in both the Top and Left box.

Region 2

Monitor 2 (Region 2) is displaying the top of the source canvas, therefore Top should be zero, the same as monitor 1 (Region 1).

Enter zero in the Top box.

To calculate the left figure (point Y, Fig.1)

Measure the distance between A and B (1500mm) minus the distance between Y to B (730mm), divide by the distance between A to B (1500mm) then multiply by the pixel width of the source (1920).

$$1500\text{mm} - 730\text{mm} = 770\text{mm}$$

$$(770\text{mm} \div 1500\text{mm}) \times 1920 \text{ pxels} = 986 \text{ pixels}$$

Enter 986 into the Left box for Region 2.

Alternatively, simply subtract the the previously calculated region width (934) from the known input canvas width:

$$1920 - 934 = 986$$

Region 3

The left figure for Region 3 will be zero as the left of the monitor displays the left of the source canvas. In a 2 x 2 monitor configuration the figure for the left will be the same for both Regions 1 and 3.

Enter zero in the Left box.

To calculate the Top figure (point H, Fig.1)

Measure the distance between A and C (900mm) minus the distance between H to C (448mm), divide by the distance between A to C (900mm) then multiply by the pixel height of the source (1080).

$$900\text{mm} - 448\text{mm} = 452\text{mm}$$

$$(452\text{mm} \div 900\text{mm}) \times 1080 \text{ lines} = 542 \text{ lines}$$

Enter 542 into the Top box for Region 3.

Alternatively, simply subtract the the previously calculated region height (538) from the known input canvas height:

$$1080 - 538 = 542 \text{ lines}$$

Region 4

To calculate the left figure (point P, Fig.1)

Measure the distance between C and D (1500mm) minus the distance between M to D (730mm), divide by the distance between C to D (1500mm) then multiply by pixel width of the source (1920).

$$1500\text{mm} - 730\text{mm} = 770\text{mm}$$

$$(770\text{mm} \div 1500\text{mm}) \times 1920 \text{ pxels} = 986 \text{ pixels}$$

Enter 986 into the Left box for Region 4.

Alternatively, simply subtract the the previously calculated region width (934) from the known input canvas width:

$$1920 - 934 = 986$$

To calculate the Top figure (point P, Fig.1)

Measure the distance between B and D (900mm) minus the distance between Q to D (448mm), divide by the distance between B to D (900mm) then multiply by pixel height of the source (1080).

$$900\text{mm} - 448\text{mm} = 452\text{mm} \div 900\text{mm} \times 1080 \text{ lines} = 542 \text{ lines}$$

Enter 542 into the Top box for Region 4.

Alternatively, simply subtract the the previously calculated region height (538) from the known input canvas height:

$$1080 - 538 = 542 \text{ lines}$$

This formula provides a 2 x 2 bezel corrected video wall.

In some instances minor adjustments may be required due to small gaps etc. Any adjustment should be made using the Top and Left controls only.

Summary of the Calculations - 2 x 2 Display Wall

Region 1

Top	o	Width	A to X ÷ A to B x 1920 =
Left	o	Height	A to G ÷ A to C x 1080 =

Region 2

Top	o	Width	Y to B ÷ A to B x 1920 =
Left	A to B - Y to B ÷ A to B x 1920 =	Height	B to K ÷ A to C x 1080 =

Region 3

Top	A to C - H to C ÷ A to C x 1080 =	Width	C to L ÷ A to B x 1920 =
Left	o	Height	H to C ÷ A to C x 1080 =

Region 4

Top	B to D - Q to D ÷ B to D x 1080 =	Width	M to D ÷ A to B x 1920 =
Left	C to D - M to D ÷ C to D x 1920 =	Height	Q to D ÷ A to C x 1080 =

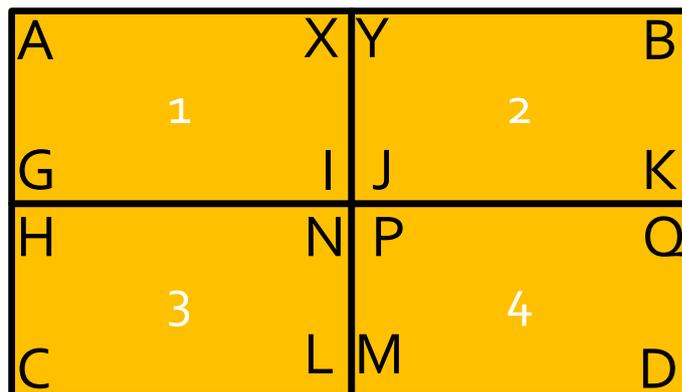


Fig.1

Windmill Configuration

The windmill configuration uses the same method of calculation as for the 2 x 2 configuration, however the source canvas (shown in green) will have elements outside the viewing area of the monitors. The none viewing areas are depicted in green in Fig. 5.

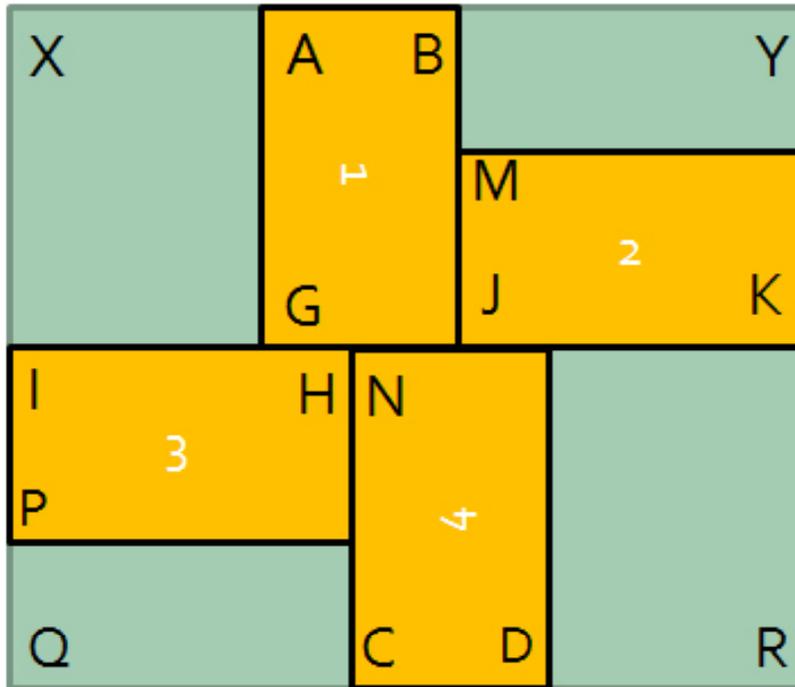


Fig.5

Monitor Rotation

When using monitors in portrait mode the region captured requires rotation. In the windmill configuration (Fig.5) monitors 1 and 4 are required to be rotated. This is done using the Transform dropdown menu in the Modify Input Capture regions dialogue (Fig. 5).

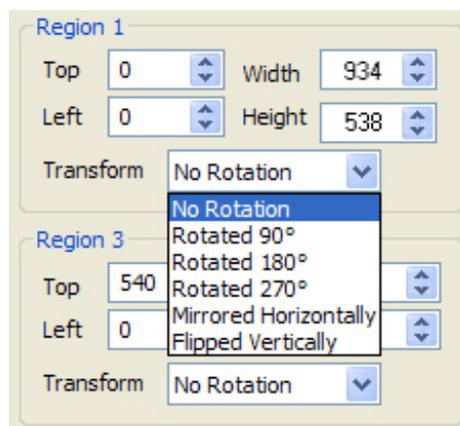


Fig.6

In the example above (Fig.5) the bottom of the monitor is facing left therefore Region 1 should be rotated 90 degrees. the bottom of monitor 4 is facing right indicating the monitor has been rotated 3 turns, therefore Region 4 should be rotated 270 degrees.

Calculations for the Windmill Configuration (Fig.3)

The first task is to determine the source canvas width and height in mm:

Using a tape measure, measure the distance from I to K but only the active screen area, i.e. do not include the outer bezels.

In this example I to K (Width) = 2500mm

To determine the source canvas height, measure the distance from B to C but only the active screen area, i.e. do not include the outer bezels.

In this example B to C (Height) = 1500mm

Region 1

To calculate the width, calculate the following:

The distance between A to B (448mm) divided by the distance between I to K (2500mm) multiplied by the source width (1920).

$$(448 \div 2500) \times 1920 = 344$$

Input the number 344 as the Width for Region 1.

For the height, calculate the following:

The distance between A to G (730mm) divided by the distance between B to C (1500mm) multiplied by the source height (1080).

$$(730 \div 1500) \times 1080 = 526$$

Input the number 526 as the Height for Region 1.

As the top of the monitor captures the top of the source canvas enter zero in the Top box for Region 1.

To calculate the Left number for Region 1:

Measure the distance from I to G (inside bezels).

In this example I to G = 695mm

Calculate the following:

The distance between I to G (695mm) divided by the distance between I to K (2500mm) multiplied by the source width (1920).

$$(695 \div 2500) \times 1920 = 533$$

Enter 533 into the Left box for Region 1.

Region 2

For the width, calculate the following:

The distance between J to K (730mm) divided by the distance between I to K (2500mm) multiplied by the source width (1920).

$$(730 \div 2500) \times 1920 = 561$$

Input the number 561 as the Width for Region 2.

To calculate the height of Region 2:

Measure the active screen area between M and J

In this example M to J = 448mm.

The distance between M to J (448mm) divided by the distance between A to C (1500mm) multiplied by the source height(1080).

$$(448 \div 1500) \times 1080 = 323$$

Input the number 323 as the Height for Region 2.

To calculate the Top number for Region 2:

Measure the distance from B to M (inside bezels).

In this example B to M = 372mm.

Calculate the following:

The distance between B to M (372mm) divided by A to C (1500mm) multiplied by the source height (1080).

$$(372 \div 1500) \times 1080 = 266$$

Enter 266 into the Top box for Region 2.

To calculate the Left number for Region 2:

Measure the distance from I to K (inside bezels).

In this example I to K = 2500mm.

Calculate the following:

The distance between I to K (2500mm) minus the distance between J to K (730mm) divided by I to K (1500mm) multiplied by the source width (1920).

$$(2500 - 730) \div 1500 \times 1920 = 1360$$

Enter 1360 into the Left box for Region 2.

Region 3

For the width, calculate the following:

The distance between I to H (730mm) divided by the distance between I to K (2500mm) multiplied by the source width (1920).

$$(730 \div 2500) \times 1920 = 561$$

Input the number 561 as the Width for Region 3.

To calculate the height of Region 3:

Measure the active screen area between I and P

In this example I to P = 448mm.

For the height, calculate the following:

The distance between I to P (448mm) divided by the distance between A to C (1500mm) multiplied by the source height (1080).

$$(448 \div 1500) \times 1080 = 323$$

Input the number 323 as the height for Region 3.

To calculate the Top number for Region 3 (In this example the top for region 3 is the same for region 4)

Measure the distance from A to C (inside bezels).

In this example A to C = 1500mm.

Calculate the following:

The distance between A to C (1500mm) minus the distance between C to H (730mm) divided by A to C (1500mm) multiplied by the source height (1080).

$$(1500 - 730) \div 1500 \times 1080 = 554$$

Enter 554 into the Top box for Region 3.

As the Left of the monitor captures the left of the source canvas enter zero in the left box for Region 3.

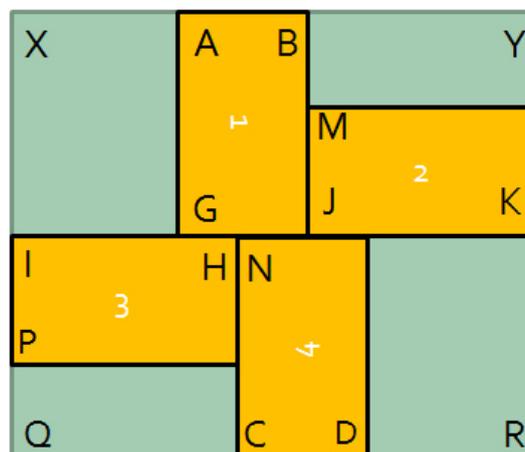


Fig.5

Region 4

For the width, calculate the following:

The distance between C to D (730mm) divided by the distance between I to K (2500mm) multiplied by the source width (1920).

$$(730 \div 2500) \times 1920 = 561$$

Input the number 561 as the Width for Region 4.

For the height, calculate the following:

Measure the active screen area between N and C

In this example N to C = 730mm.

The distance between N to C (730mm) divided by the distance between A to C (1500mm) multiplied by the source height(1080).

$$(730 \div 1500) \times 1080 = 526$$

Input the number 526 as the Height for Region 4.

To calculate the Top number for Region 4

Measure the distance from A to C (inside bezels).

In this example A to C = 1500mm.

Calculate the following:

The distance between A to C (1500mm) minus the distance between C to N (730mm) divided by A to C (1500mm) multiplied by the source height (1080).

$$(1500 - 730) \div 1500 \times 1080 = 554$$

Enter 554 into the Top box for Region 4.

Alternatively, simply subtract the the previously calculated region height (526) from the known input canvas height:

$$1080 - 526 = 554 \text{ lines}$$

To calculate the Left number for Region 4:

Measure the distance from I to N (inside bezels).

In this example I to N = 730mm.

Calculate the following:

The distance between I to N (730mm) divided by I to K (2500mm) multiplied by the source width (1920).

$$(730 \div 2500) \times 1920 = 561$$

Enter 561 into the Top box for Region 4.

Summary of the Calculations - Windmill Display Wall

Region 1

Top	o	Width	A to B ÷ I to K x 1920 =
Left	I to G ÷ I to K x 1920 =	Height	A to G ÷ A to C x 1080 =

Region 2

Top	B to M ÷ A to C x 1080 =	Width	J to K ÷ I to K x 1920 =
Left	I to K - J to K ÷ I to K x 1920 =	Height	M to J ÷ A to C x 1080 =

Region 3

Top	A to C - C to H ÷ A to C x 1080 =	Width	I to H ÷ I to K x 1920 =
Left	o	Height	I to P ÷ A to C x 1080 =

Region 4

Top	A to C - C to N ÷ A to C x 1080 =	Width	C to D ÷ I to K x 1920 =
Left	I to N ÷ I to K x 1920 =	Height	N to C ÷ A to C x 1080 =

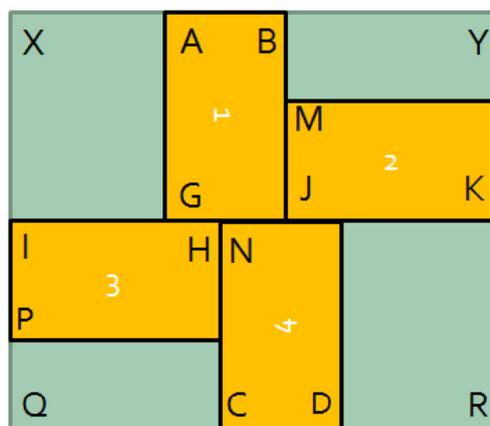


Fig.5

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