

# Configuring High Resolution Inputs White Paper

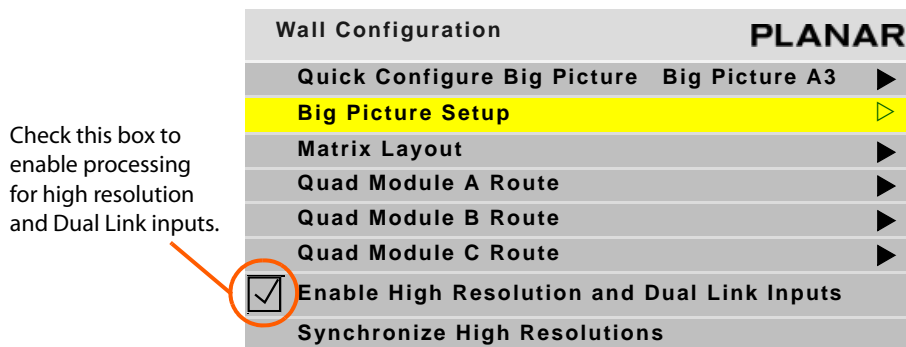
High resolution inputs are any inputs to the Clarity Matrix Video Wall that have a pixel clock greater than 165MHz, have a horizontal resolution greater than 2045 pixels or a vertical resolution greater than 2047 pixels. Such inputs are supported in Clarity Matrix but have limitations and restrictions as described in this section.

## Hardware Limitation

The Image Processing chip used in the Matrix design has an input limitation of 165Mhz pixel clock and 2047 pixel horizontal or vertical resolution. However, be aware that the Matrix is a system of multiple chips each supporting a separate LCD display, you can still display such resolutions by spreading that image over more than one display in the system. You just need to provide the correct portion of the image for display. This is accomplished through front-end FPGA (field programmable gate array) logic in the Quad controller module and communication amongst the processors via the RS485 link.

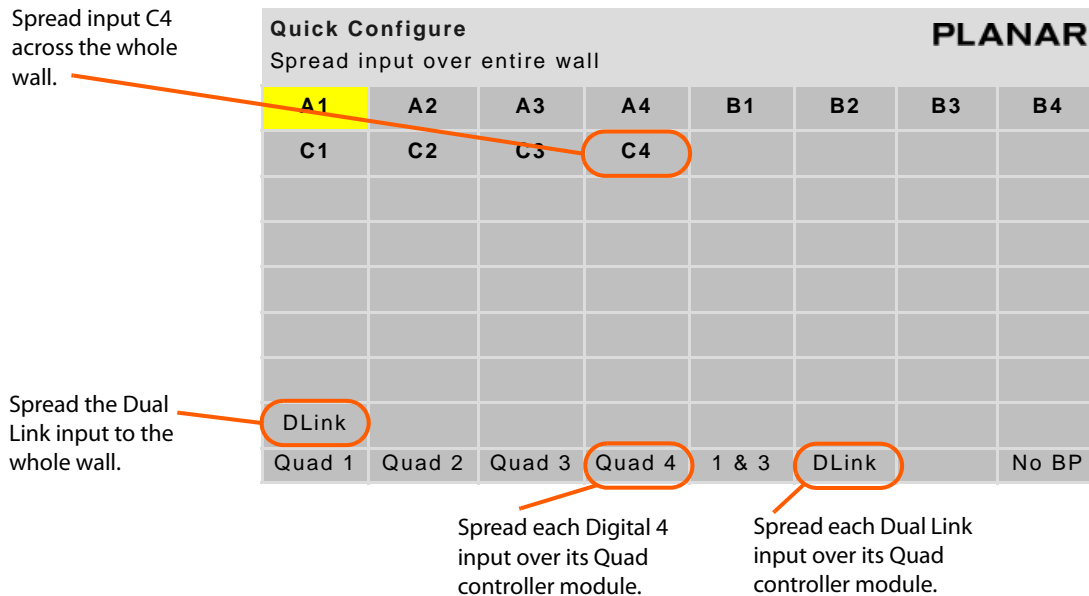
## High Resolution Setup

In order to use high resolution inputs with the Matrix, the capability must be turned on by checking the ENABLE HIGH RESOLUTION AND DUAL LINK INPUTS box in the WALL CONFIGURATION menu.



A high resolution input must use the Clarity Big Picture capability, either spreading the picture across the entire wall of displays or across some subset of displays, but it must be more than one. If a high resolution input is received and wall mode is not enabled, you will see only half of the image. In this case the message "Image truncated – Must use Big Picture" will appear on the BIG PICTURE SETUP menu and also on the UNIT STATUS menu.

The simplest way to set up the Big Picture is with the QUICK CONFIGURE BIG PICTURE menu (MAIN MENU > WALL CONFIGURATION menu). If your high resolution input is on the Dual Link input, spread it across the whole wall by choosing the DLINK button on the left edge of the menu. If you want to spread it to only one Quad controller module (e.g. when using a video processor), use the DLINK button on the bottom row of the menu.



Single link high resolution inputs must also be Big Pictured. Use the buttons on the QUICK CONFIGURE menu to choose the input you want to Big Picture. Auto layout discovery must be completed on the wall before quick configure setup can work properly. See "Matrix Layout Menu" on page 59. for more details about auto layout discovery.

## Dual Link vs. Single Link

High resolution inputs can be used on any of the five inputs to the Quad controller module. However, when using the single link inputs (Digital 1 through Digital 4) the pixel clock may not exceed 165MHz. Almost by definition, any high resolution input running at 60 frames per second will exceed this limit. However, there are many high resolution inputs at lower frame rates that can be input to the single link input.

Many PC video cards will automatically switch to Dual Link output when the pixel clock exceeds 165Mhz. You can sometimes force them back to single link by choosing a lower vertical refresh rate.

## Cabling for Dual Link

The Dual Link input of the Quad controller module is also the input used to loop signals through from one Quad controller module to the next. Therefore only one Dual Link input may be used when enabling the Clarity Big Picture. Connect the Dual Link signal to any of the Quad controller modules and cable the Dual Link out of that controller to the Dual Link In of the next controller and so on. The Dual Link Out connection of the last Quad controller module will remain unconnected.

Multiple Dual Link inputs may be used in the system if each one is connected to a different Quad controller module. A typical application for this would be a system with an external video processor. By using one high resolution output of the processor per Quad controller module, the overall number of processor outputs needed may be reduced. In this situation, no loop through cables are needed.

## Configuring a New High Resolution Input

When a new signal is acquired or the Big Picture setup has changed, the processors must communicate various information to each other. Because of limitations in the RS485 link, this communication can take several seconds to occur. During this time, the image on the wall may not be scaled correctly. You will see each display pop into place as the RS485 communication completes. Once you have made a change, you can speed up this period of resynchronization by pressing ENTER on the SYNCHRONIZE HIGH RESOLUTIONS line in the WALL CONFIGURATION menu. Be aware that the same processing must happen when switching to a low resolution input after displaying a high resolution input, and this control may be used in that case as well.

When using the quick configure option, the system will synchronize automatically<sup>1</sup>. When a configuration is saved in a slot, the necessary information about high resolution inputs is saved as well. Once a configuration is set up, the easiest way to return to that configuration later is to recall it from a slot (see *Saving Configurations* on page 95). You must have the input in place at the connector before recalling the slot.<sup>2</sup>

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<sup>1</sup> In Rev 02 firmware, the Quick Configure option does not always synchronize quickly. Sometimes it takes several seconds.

<sup>2</sup> In Rev 02 firmware, synchronization after a slot recall does not always work. The system will align correctly in several seconds.

## Handling Vertical Resolutions Greater Than 2047 Pixels

The processing chip has a 2047 line limitation in detecting a video source. If it gets a source that is greater than 2047 lines, the reported line total is the actual total minus 2048. The firmware works around this limitation by making educated guesses about the true total. Since the majority of applications will want to display native resolution on the Clarity Matrix, the firmware specifically looks for input resolutions that are multiples of native resolution. So, if it sees a reported input resolution of 1366 x 256, it will assume that the actual input resolution is 1366 x 2304 (a 1x3 column of native resolution). Similarly, it will assume 1366 x 1024 is actually 1366 x 3072. Vertical resolutions greater than 2047 lines that are not multiples of 1360, 1366 or 1368 horizontally are not supported.

## Supported Resolution Summary

Up to 2045 pixels horizontal Up to 2047 pixels vertical Pixel clock less than 165MHz	Supported on all inputs
2046 to 4097 pixels horizontally  Up to 2047 pixels vertically Pixel clock less than 165MHz	<ul style="list-style-type: none"> <li>• Supported on all inputs.</li> <li>• Big Picture (Wall mode) must be selected to spread image over more than one display horizontally.</li> <li>• Must enable high resolution inputs in the WALL CONFIGURATION menu.</li> <li>• System will take several seconds to scale correctly.</li> </ul>
1366x2304 1360x2304 1368x2304 1366x3072 1360x3072 1368x3072 Pixel clock less than 165MHz	<ul style="list-style-type: none"> <li>• Supported on all inputs.</li> <li>• Big Picture (Wall mode) must be selected to spread image over more than one display vertically.</li> </ul>
2720x2304 2732x2304 2736x2304 2720x3072 2732x3072 2736x3072 Pixel clock less than 165MHz	<ul style="list-style-type: none"> <li>• Supported on all inputs.</li> <li>• Big Picture (Wall mode) must be selected to spread image over more than one display horizontally and vertically.</li> <li>• Must enable high resolution inputs in the WALL CONFIGURATION menu.</li> <li>• System will take several seconds to scale correctly.</li> </ul>
Any resolution with Pixel clock greater than 165MHz	<ul style="list-style-type: none"> <li>• Supported only on Dual Link Input.</li> <li>• Big Picture (Wall mode) must be selected to spread image over more than one display.</li> <li>• Must enable high resolution inputs in the WALL CONFIGURATION menu.</li> <li>• System will take several seconds to scale correctly.</li> </ul>

## Contact Information

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