Nova Mars

LED Control Software

User Manual

Version 1.6

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Introduction

Due to their modular construction, both permanent and rental LED screens are built from a horizontal (X) and vertical (Y) array of LED panels.

As these panels are assembled into an array, the screen begins to take on its X and Y pixel count and physical X and Y dimensions.

At the end of the construction process however, the array of LED panels needs to be programmed; a process that defines the pixel count on each panel, the panel's position within the video image and the display parameters of the panel such as brightness, colour temperature and gamma.

All of these programming operations are performed through a software suite called Nova Mars.

This manual details the installation, the day-to-day and the advanced programming operations of Nova Mars and its environment.

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digiLED Navigator-NV LED Processors are covered by international patents and registered designs. digiLED Navigator-NV LED Processors are CE and FCC compliant, certification available from displayLED on request. digiLED Navigator-NV LED Processors meet current European RoHS and WEEE legislation. Certification is available from displayLED on request at the above address.

Terminology

It is a known industry problem that there is no international standard for naming the components of an LED screen.

This document is written in accordance with the digiLED standard of component names.

Please take note of the definition of phrases such as "Tile" "Module" and "Panel" as described in the Glossary for further information.

In This Manual

Please note - This document has an interactive table of contents when delivered in electronic form. Clicking on a Table of Contents entry will jump to that section of the document.

This manual contains information about the installation and operation of the software programme "Nova Mars LCT"

The operation section is divided into sections ranging from day-to-day operations through to Advanced. Please use the Table of Contents to locate the appropriate section for your needs.

Installation

Nova Mars is supplied as a self-installing .exe file that can be run on any Windows PC with Windows XP or later.

The .exe file is self extracting and will automatically place the relevant files in the correct folder locations within the Windows PC.

Figure 1 - The Icon for Nova Mars v 4.2.5 Installation Program

Simply double clicking the file / icon will start the process.

A number of confirmation windows will then be displayed as the installation continues asking where files are to be placed and requesting permission to continue etc.

Simply clicking OK or CONTINUE on these confirmations will create an installation suitable for most Windows machines.

Custom paths can be chosen for the installation however this is not recommended for anyone other than advanced PC users.

Installation Steps

Please note - If users are happy to simply use default installation parameters, this chapter can be skipped by simply clicking "YES" "OK" or "CONTINUE" as prompts appear.

Double Click the installer's icon to start the process.

It is possible that a Windows Defender or User Account Control prompt will appear asking for permission for Nova Mars to make changes to the computer.

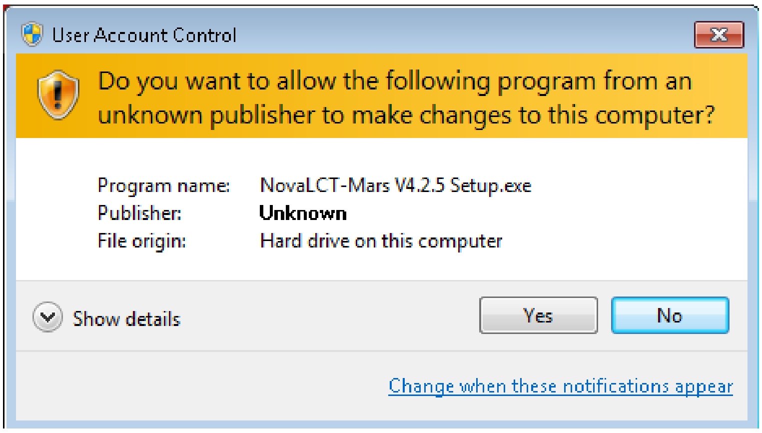

Figure 2 - User Account Control Confirmation

Click YES to continue the installation.

The language confirmation window will now be displayed.

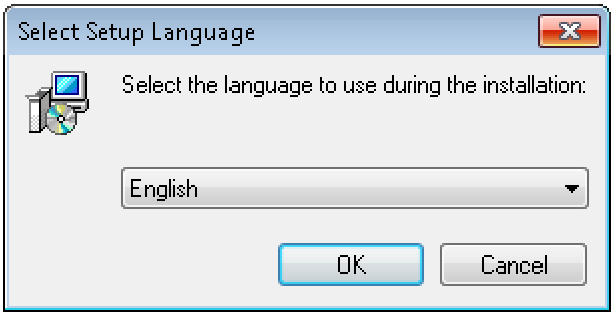

Figure 3 - Installation Language Confirmation

The example continues with ENGLISH as the selected language.

Depending on whether Nova Mars has previously been installed on the PC or not, there may now be a confirmation window requesting permission to overwrite the previous version.

If the PC has never had Mars installed, this window will not appear.

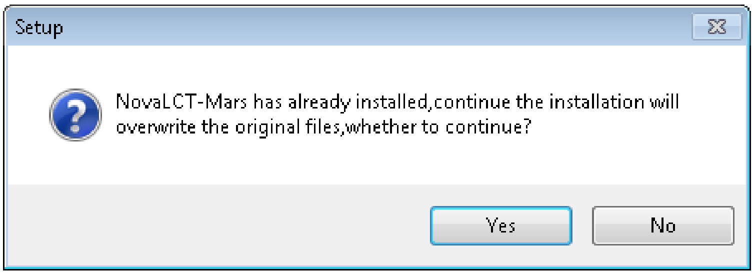

Figure 4 - Version Overwrite Confirmation

Assuming you wish to continue installing the new version of the software, click YES to continue.

An installation introduction window will now appear:

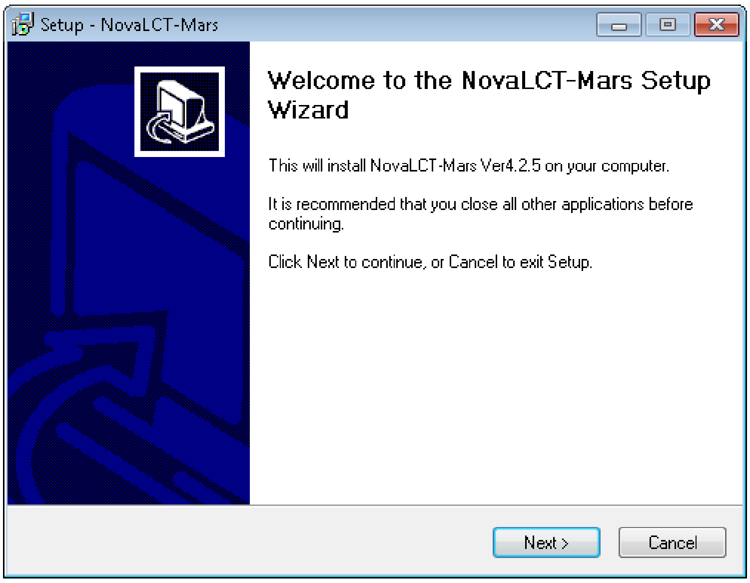

Figure 5 - Installation Introduction

Click NEXT to continue.

You will now be asked to verify the path where Nova Mars should be installed. By default the installer suggests the standard path within the Program File (86) folder of the hard drive.

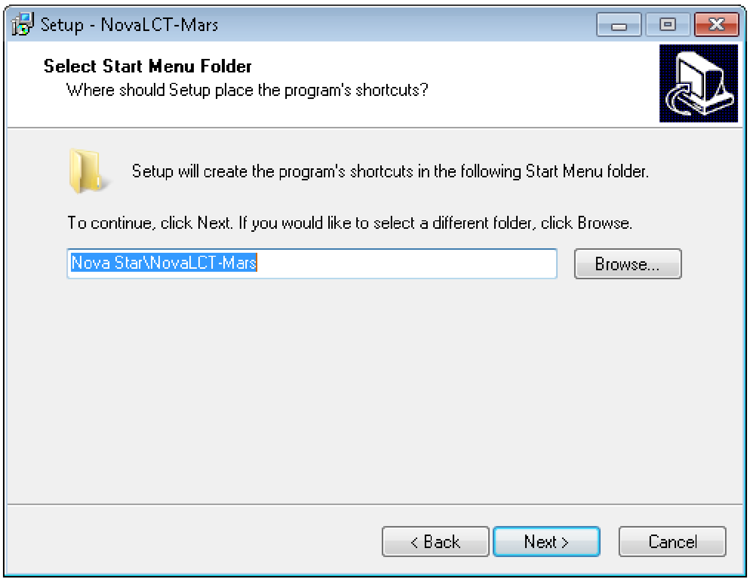

Figure 6 - Installation Path Confirmation

Click NEXT to continue or BROWSE for a custom installation path[1]

You will then be asked whether a Desktop Icon is required.

[1] Not recommended for anyone other than advanced Windows users.

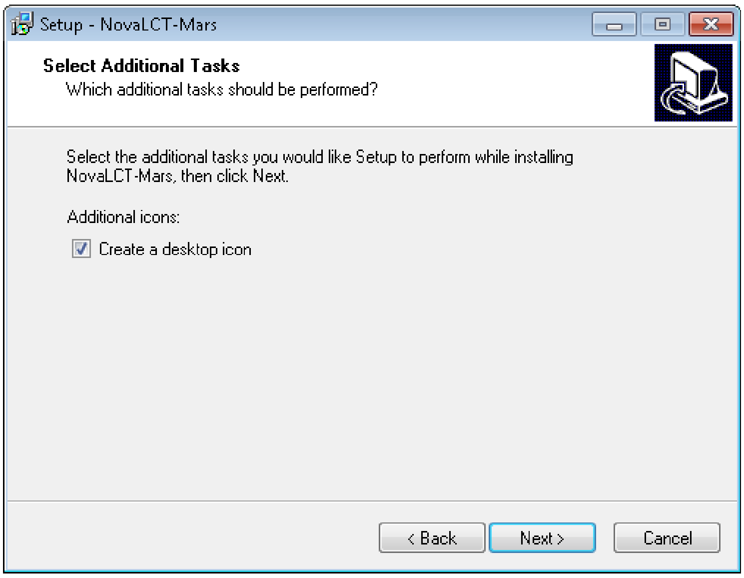

Figure 7 - Desktop Icon Confirmation

Tick or un-tick the square box depending on your preference for having a desktop icon created then click NEXT to continue.

A Ready to Install window with then be displayed with a summary of your choices:

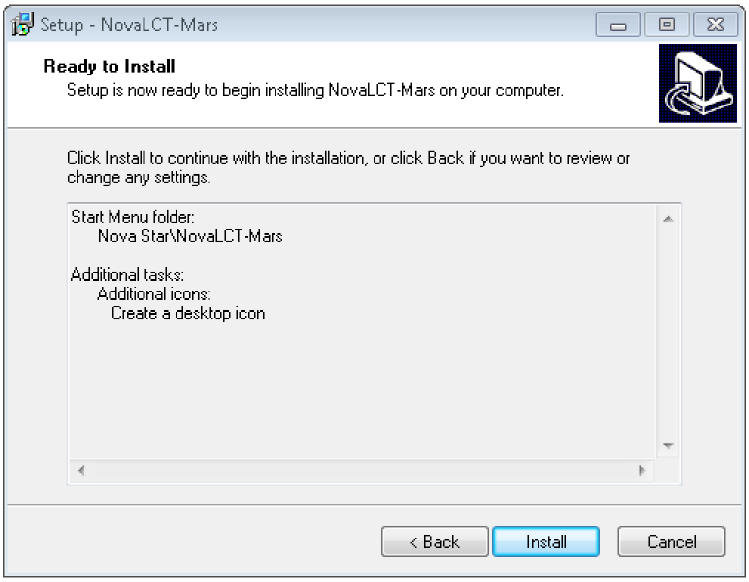

Figure 8 - Installation Summary Window

The installation will the proceed with a progress bar displayed in the install window:

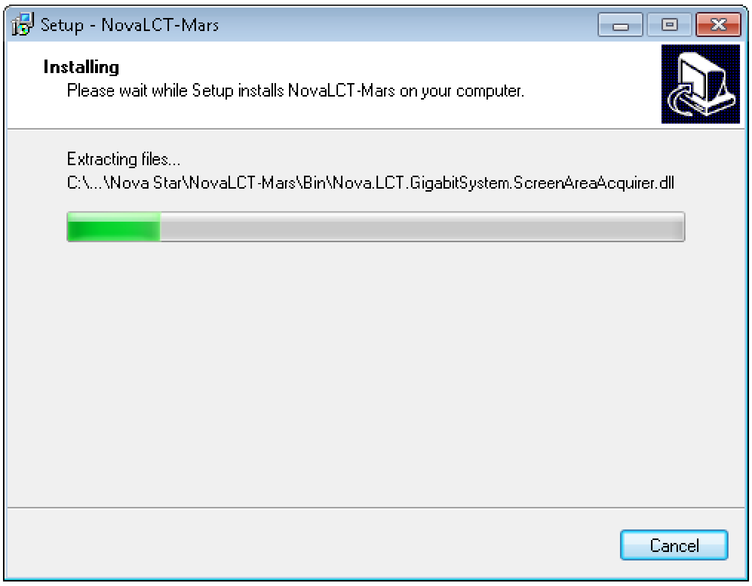

Figure 9 - Installation Progress Window

A sub-task will then start that installs the USB / RS232 drivers onto the PC. This again has a number of confirmation windows.

In the background it is normal to see a DOS window appear during this section of the installation. All user interaction is still carried out however via Windows confirmation prompts.

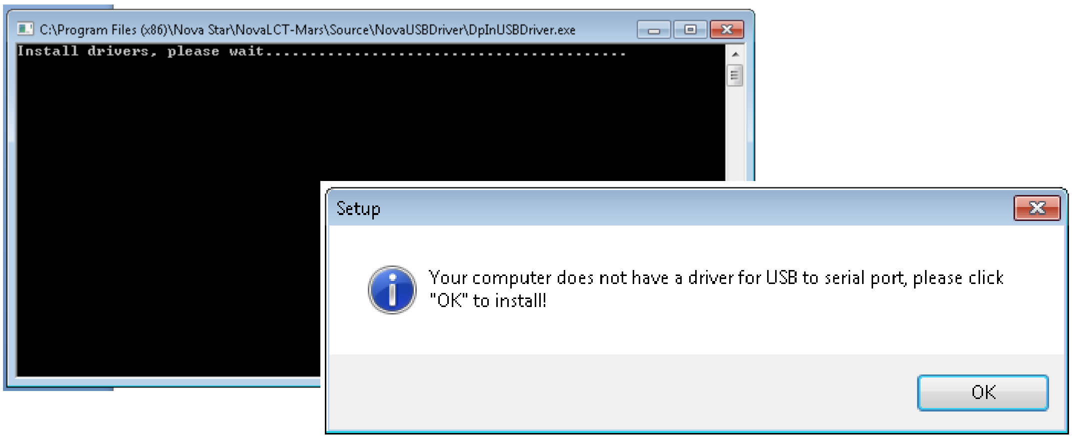

Figure 10 - Confirmation of USB Driver Installation (DOS Window in background)

Click OK to confirm the USB Driver installation process.

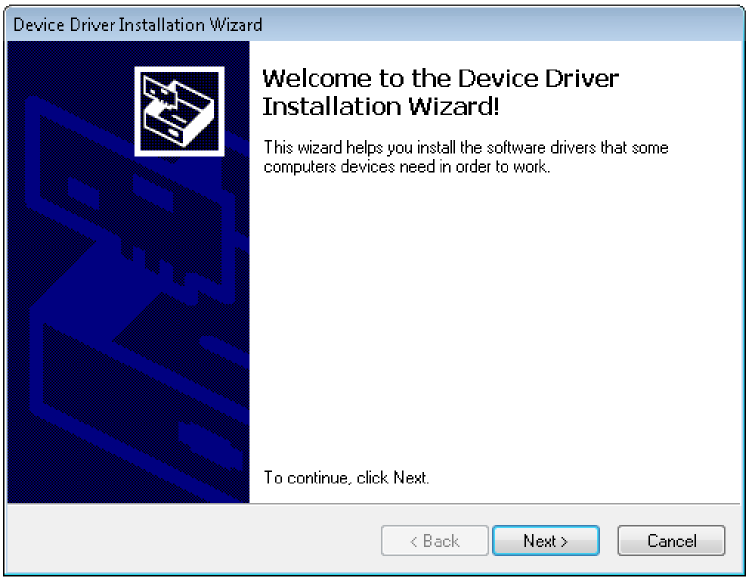

Figure 11 - Driver Installation Window

Click NEXT on the above window to proceed with the driver installation.

It is possible at this point that Windows will again pop up a security confirmation that checks you wish to proceed with the driver installation.

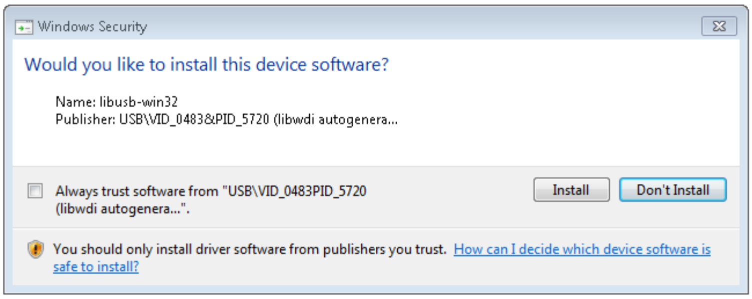

Figure 12 - Security Confirmation of Driver Installation

Click INSTALL to proceed with the Device Driver Installation.

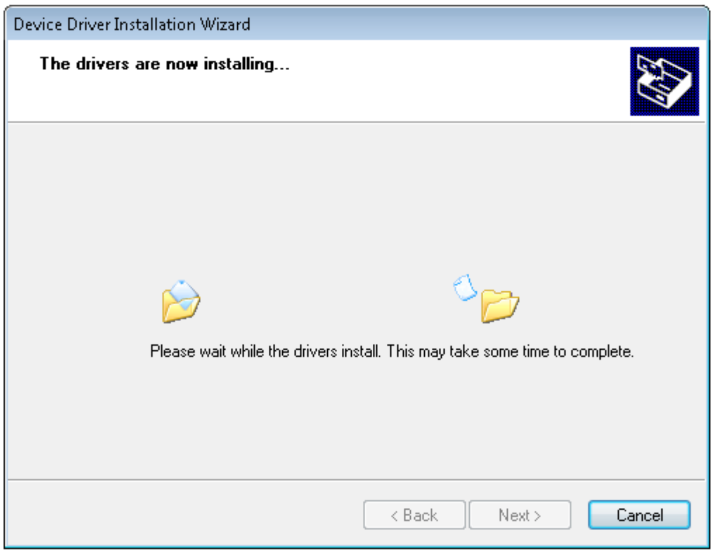

Figure 13 - Driver Installation Progress Window

After the installation task completes, two confirmation windows will be displayed; one showing the successful completion of the driver install and the second showing the successful completion of the Nova Mars install.

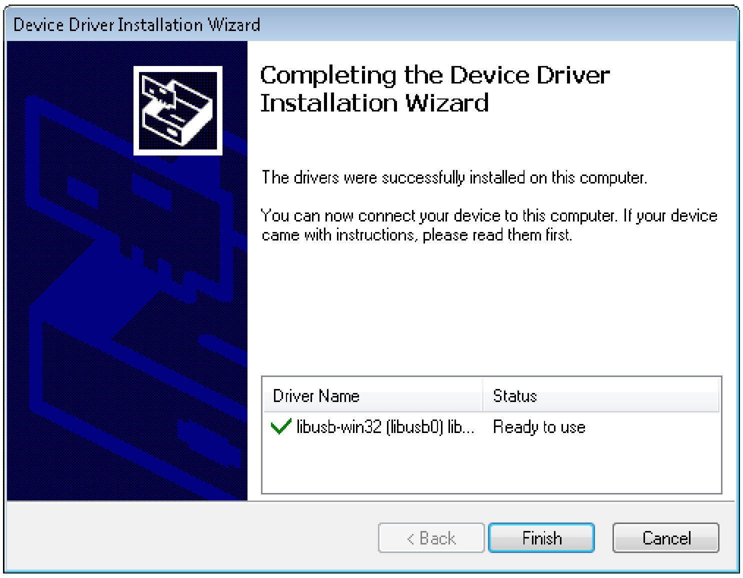

Figure 14 - Successful Driver Installation Confirmation

Click FINISH to complete the driver installation.

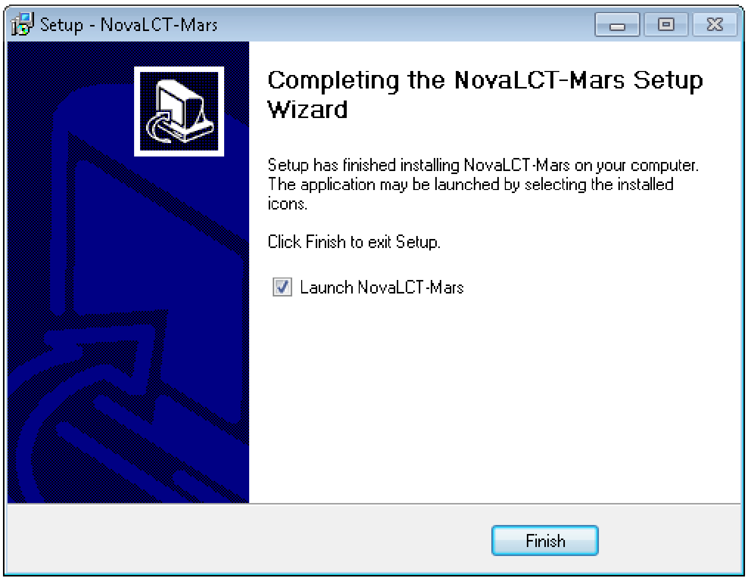

Figure 15 - Nova Mars Installation Completion

Click FINISH to complete and then launch the Nova Mars program. If successful, the Nova Mars program will then load and display the main window as shown below:

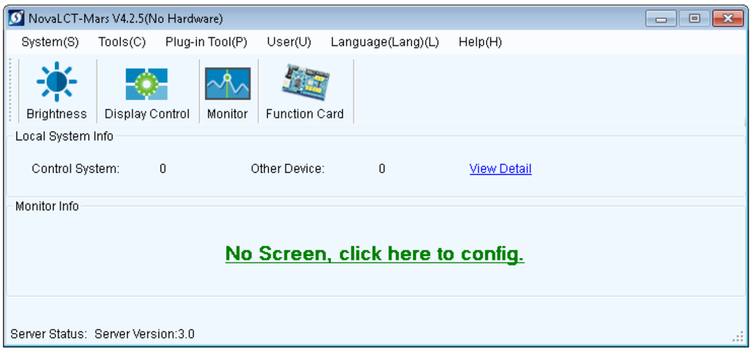

Figure 16 - Nova Mars Main Window

This completes the installation process of Nova Mars.

Versions
Since 2014, Nova Mars has been distributed on the major release of version 4.

At the time of writing, all digiLED products use Nova Mars version 4.x.x .

digiLED will provide specific instructions with each digiLED product purchased as to which is the correct version of software to use with you LED panels.

Please note however that with Nova Mars, it is NOT the case that the newest software version is the best.

Back-compatibility with older generation hardware in some LED panels may mean that those particular panels MUST be used with a particular legacy version of the software.

The table below summarises some of the more common digiLED products and their Mars version compatibility.

Product	**Nova Mars Version**
digiLED LightSlice	4.2.6
digiLED LT Series LED Panels	4.1.1
digiLED Toura 6 LED Panels	4.3.0
digiLED Toura 10 LED Panels	4.1.1
digiLED digiFLEX 4mm Tiles	4.3.0
digiLED iMAG LED Panels	4.4.1
digiLED vHRI LED Panels	4.2.6

Figure 17 - digiLED Products and their Compatibility

Installing Multiple Mars Versions on One PC
Please see the section in the Appendix for details on how to create multiple Mars installations on one single PC.

Background Services
Providing that Windows security systems and anti virus programmes have allowed a correct installation to complete, two background processes will run in addition to Nova Mars:

These processes are:

- BrightAdjustTool
- Mars Server Provider

These can be seen as small icons beside the clock of the windows task bar or as processes within Windows Task Manager. (sometimes viewed by selecting "show hidden icons")

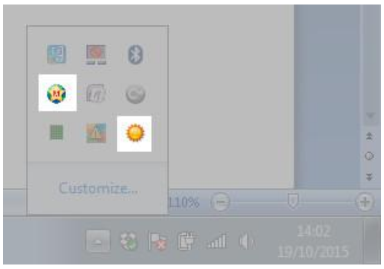

Figure 18 - Icons for Background Processes

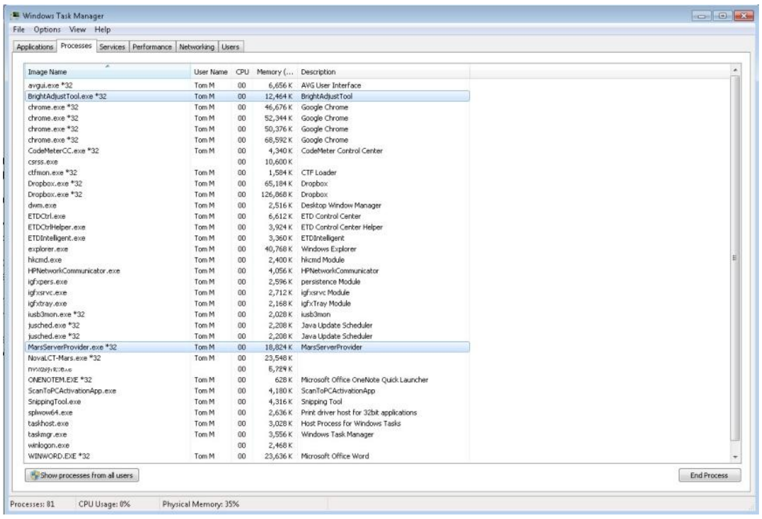

Figure 19 - Task Manager Background Processes (highlighted) for correct Nova Mars Operation

Nova Mars will not operate correctly unless both of these background services are installed and operational.

While this process happens automatically for 99% of Nova Mars installs, it is possible that excessively gnarly antivirus programs may prevent the correct operation of the processes.

Please see below for further advice regarding antivirus software.

Anti-Virus & Administrator

Common reasons that a Nova Mars installation fails are:

- The Windows User did not have Administrator privileges on the PC.
- The Windows Defender features were set to an unusually high level of protection.
- Third party Antivirus software prevented the correct installation of the software.

For trouble free installation, digiLED recommends that only users with Administrator level privileges install Nova Mars on PCs.

Similarly, please speak to your IT administrators about using a lower level setting in Windows Defender if it is felt that this has caused an installation to fail.

First Run

Although not critical, it is recommended that the PC running Nova Mars is connected to a digiLED Navigator-NV *before* the software is run for the first time.

If it the first ever time that the PC has been connected to a Navigator-NV, a plug-and-play process will start that installs and activates the background USB driver service.

As above, it is possible that this process will be blocked by overzealous antivirus programmes or Windows Defender actions however, in most cases with a normal Windows environment, this process is fully automatic.

Connection to Navigator-NV

A PC is connected to a Navigator-NV via a USB A to B cable.

If possible, please use the cable supplied with the Navigator-NV from new. If this is not available, third party cables may be used so long as they do not exceed 3m in length.

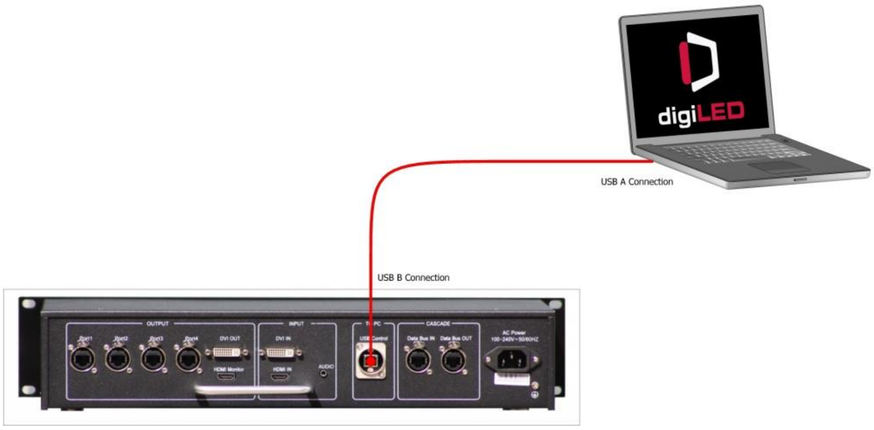

Figure 20 - PC to Navigator-NV USB A to B Connection

Connect power and turn on the Navigator-NV then wait for Windows to complete the driver installation.

After approximately 45 seconds, Nova Mars can be started by double clicking the desktop icon or running the programme from the Windows Start Menu.

Providing that the USB driver installation has completed and Nova Mars can communicate with the Navigator-NV, the LOCAL SYSTEM INFO indicator in the main window of Mars should show CONTROL SYSTEM : 1

Windows 10 users please note: It has become apparent that Windows 10 often benefits from a complete Windows shutdown and reboot after a Nova Mars installation. If you experience problems with the first run of Mars, this should be your first course of action.

Advanced User Login

Nova Mars has two levels of user available.

- Basic
- Advanced

All operations described in this manual are undertaken as an Advanced user.

To login as an advanced user click USER(U) in the top menu bar.

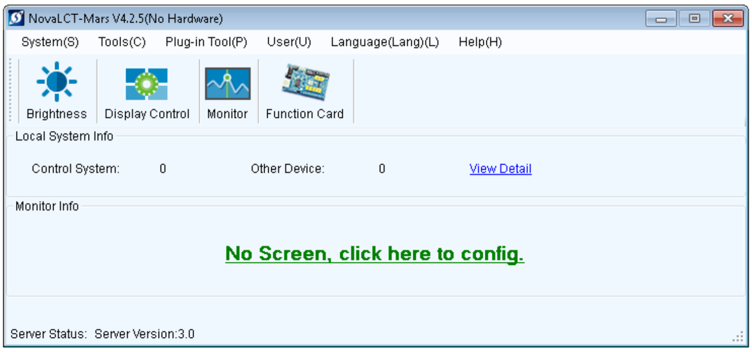

Figure 21 - User Login from Top Menu Bar

Two possible passwords can be used to enter advanced mode:

- admin
- 666

Either password results in the same level of advanced user login.

Once successfully logged in, additional icons become visible in the Nova Mars main window as shown below:

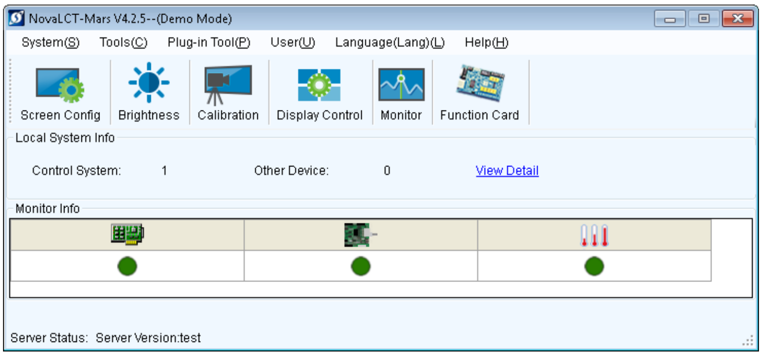

Figure 22 - Additional Icons after Login

Nova Mars is now ready for screen setup and programming.

Screen Setup and Programming

Screen Programming Principals

Screen programming operations with Nova Mars are broadly divided into a three stage process, each stage of which must be completed in sequence.

- Setting and saving of the Navigator-NV Sending Board parameters.
- Setting and saving of the LED Panel Scancard parameters.
- Setting and saving the cable route & pixel mapping of the array of LED panels.

Since these three processes are all interdependent, it is important that they are carried out in order.

Critical Points

- As stated above, it is essential that an LED screen programming operation is conducted in the ordered sequence:
    - Sending Board
    - Scancard
    - Pixel Map

  A common cause of LED refresh flicker is, for example, the Send and Save of Scanboard parameters *before* the correct EDID has been correctly set.

- It is critical that the refresh frequency selected in the Sending Board settings is in agreement with the real-world DVI signal being fed to the Navigator-NV

- It is critical that users do not change the parameter of the Scancard in the Scancard window as these have been optimised by the factory and should not be altered.

Sending Board

To start the LED screen programming process, first ensure that Nova Mars is logged in with Advanced User privileges (as detailed above).

In the top icon bar of the Nova Mars software, click SCREEN CONFIG to enter the programming environment.

A confirmation window will pop up asking which Com Port should be used for the connection.

In normal configurations, only one Com Port will be in use and only one will be suggested[2].

In addition, a two-choice radio button will ask whether to CONFIG SCREEN or to LOAD CONFIG FILE.

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[2] Multiple com ports may be suggested / offered if multiple Navigator-NV units are connected however for the purposes of this example, we shall assume only one Navigator-NV is connected.

CONFIG SCREEN is selected by default. Click NEXT to continue. The following window will be displayed:

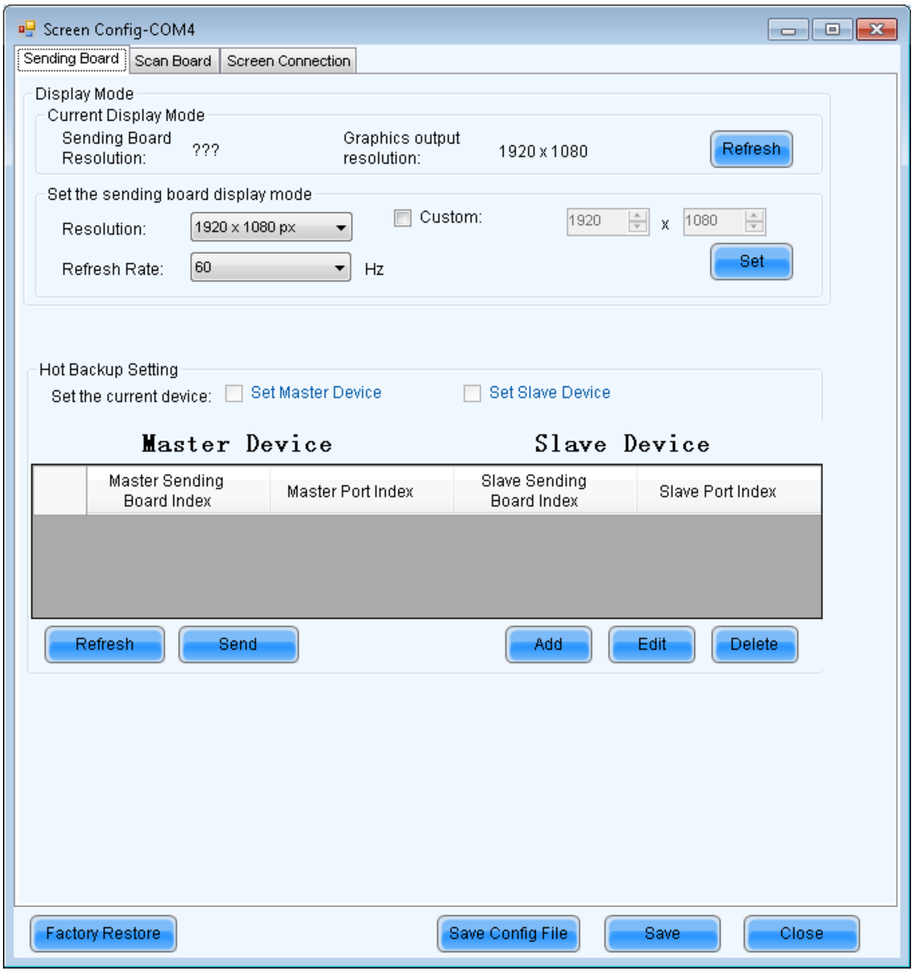

Figure 23 - The Sending Board Tab of Screen Config

EDID and Frame Rate

At the top left of the Sending Board Window are two settings relating to the DVI or HDMI signal that is to be supplied to the Navigator-NV.

Comprising of the horizontal and vertical DVI signal resolution and the frame rate that it is to be supplied at, these settings are commonly referred to as the EDID[3].

In a scenario where a Navigator-NV is plugged directly into a laptop or PC graphics card, it is these EDID settings that will be 'requested' from the graphics card.

In scenarios where an external Scalar or DVI device is supplying the signal however these EDID settings *may* be ignored by the DVI supplier-device.

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[3] Please note - these EDID settings have no relation to the LED screen pixel count or resolution.

A critical factor for a successful screen config is to always ensure the requested EDID settings match the real-world DVI signal parameters being supplied to the Navigator-NV.

If for example the DVI signal is running at 60Hz and the Navigator-NV is requesting 50Hz, this discrepancy will cause programming issues further down the line.

Always check that both H resolution, V resolution and frame rate are 100% in agreement between source and Navigator-NV before proceeding with any further screen configuration.

Acceptable input resolutions are:

- 640x480
- 800x600
- 1024x768
- 1280x768
- 1280x800
- 1280x1024
- 1366x768
- 1440x900
- 1440x1080
- 1600x900
- 1600x1200
- 1680x1050
- 1728x1296
- 1792x1344
- 1920x1080
- 1920x1200
- 2048x1152

Higher resolutions than those listed here should not be used.[4]

It is recommended[5] that users never use the CUSTOM tick box in the EDID settings as this may cause unpredictable behaviours from some graphics cards.

After making any changes to the EDID settings, always click SET to transmit the change to the Navigator-NV

Set, Send and Save

A recurring pattern throughout Nova Mars is the need to follow a Set, Send and Save operation.

[4] If your LED screen build has more pixels than the available resolutions listed, please see the section on "Beyond HD Pixel Mapping" for further info.

[5] Recommended = not advisable in 99% of programming scenarios however may be used (under advisement from digiLED) in unusual or bizarre screen setups.

Although in the EDID example above there is no SEND, the process should always be completed by clicking the SAVE button at the bottom of the window.

Users should become familiar with the Set, Send and Save process as it recurs again and again in LED screen programming.

Without the SAVE button being clicked, if the Navigator-NV lost power, it would reboot in its previous settings, losing any changes that were made.

Using the SAVE button at the end always ensures that the parameters just changed will load when the machine reboots or is re-powered.

An alternative way of thinking of this feature is as an "UNDO" button.

If for example you click SEND and the screen programming goes badly wrong, the process can be undone by simply disconnecting and then repowering the LED panels.

When they boot, they'll boot with the old setting !

Other Sending Board Parameters

The additional Sending Board parameters displayed in this window are not used in this programming example.

Please see the chapter "Advanced Programming and Screen Configuration" for advanced Sending Board operations.

Scan Board

Clicking on the second tab at the top of the Screen Config section will display the Scan Board Tab.

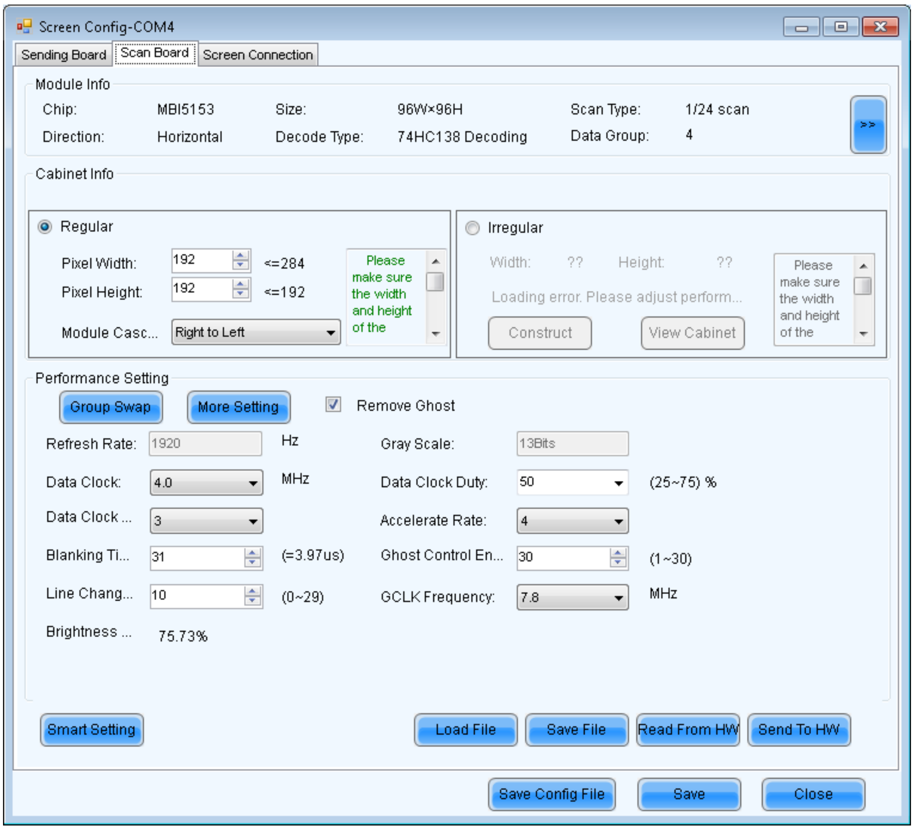

Figure 24 - the Scan Board Tab

The settings controlled via the Scan Board tab are used to configure the receiver cards inside the LED panels.

Normally, all Scanboards within a Screen have the same configuration settings written to them so that all Panels display an image with the same Brightness, Gamma, Refresh and Scan rate.

CAUTION

A golden rule for the Scan Board page is Don't Fiddle !

There are more than 50 parameters built into this page, many of which are interdependent.

Upset one, you may upset many more.

The only recommended way to use the Scan Board page is to load a pre-made file (called a .rcfg file) and apply this to the Panels without modifying it in any way.

Do not change any Scan Board parameters yourself !

.rcfg File Source

As mentioned above, all Scan Board parameters are saved in a file with the extension ".rcfg" . To load the correct parameters for your Scan Board and LED Panel, it is simply a matter of loading the correct .rcfg file from the archive.

The .rcfg file archive is always stored on the internal SSD drive of new Navigator-NV units when purchased from digiLED.

Assuming a particular project code screen is purchased from digiLED, the internal SSD will also have a .rcfg file associated with that project code as shown below:

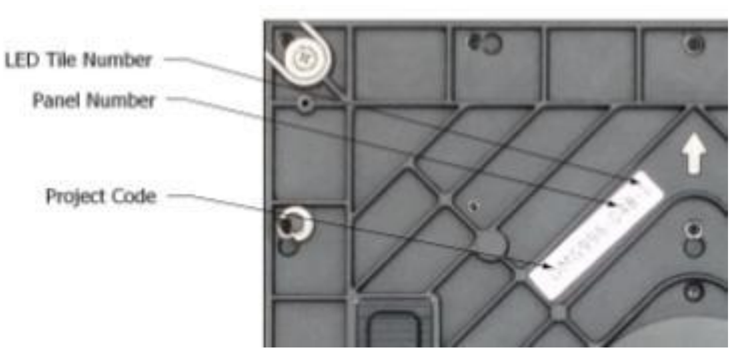

Figure 25 - LED Tile rear showing Project Code

DVH1001 - VHRi1.9	28/10/2015 08:22	File folder
DMG1003 - iMAG-R 3900 rcfg file	28/10/2015 08:22	File folder
DMG996 - iMAG-R 3200 rcfg FILE	03/09/2015 10:51	File folder
DMG993 - iMAG-R 2600 rcfg FILE	11/08/2015 09:24	File folder
DMG992 - iMAG-R 3200 rcfg FILE	11/08/2015 09:24	File folder
DMG991 - iMAG-R 3200 rcfg FILE	11/08/2015 09:24	File folder

Figure 26 - Project Code DMG966 .rcfg file located on the Navigator-NV SSD

The .rcfg file collection can be found at

e:\RCFG Files\

(where e:\ is the drive letter that windows has given to the Navigator-NV SSD)

.rcfg File Source (2)

In situations where the Navigator-NV file archive is not available, it may be possible to read-back the .rcfg file from a healthy Scan Board.

While this should only be treated as an emergency backup procedure, it will normally yield a healthy file read-back in 95% of cases.

Please note, read-back will only work if you have a healthy and happy LED panel that is displaying a stable image on at least one panel.

This read-back process will only work with regular size / shape panels such as a digiLED iMAG panel and is not applicable to odd shaped screens such as digiLED LightSlice.

To read-back an .rcfg file, click the READ FROM HW button at the bottom of the Scancard window.

Once you have a confirmation pop up that the process has completed successfully, the read-back data in the Scan Card tab can then be either saved to a file on the PC or transmitted to all remaining Panels within the LED screen.

Send and Save

As in other areas of Nova Mars, to finalise operations on Scan Boards, both an SEND and SAVE must be executed.

Use the SEND to HW (Send to Hardware) button at the bottom right of the Scan Board Tab to transmit all the data from the Scan Board tab to the Scancards within the screen.

A confirmation window will be displayed asking which boards it should be applied to and whether the Scancards should undergo a full, low-level reset (tick box marked RESET POSITIONS)

digiLED recommends that a quick and dirty Send and Save can be done simply by hitting the OK button on this window.

If some panels are being troublesome or refuse to align with neighbours in either Brightness or Refresh, digiLED recommends the RESET START POSTION box is ticked before hitting OK.

With this box ticked, the process will take more time but a more thorough reset and reconfigure of the Scancards takes place.

To finalise all the transmitted parameters and lock them into permanent memory, please click the SAVE button to complete the process.

Please note - if the SAVE button has been clicked, Nova Mars will not let you exit this section of the program without double checking that you wished to hit the SAVE button.

Without the SAVE button, none of the changes you have made will be seen the next time the screen boots up.

Scan Board Tab - Advanced Operations.

Some digiLED products such as digiLED LightSlice require programmers to enter some of the more advanced sections of the Scan Board Tab.

Please only do this if a product-specific manual tells you to do so.

Consequently, Advanced Scan Board Tab operation are not covered within this section of the manual.

Screen Connection and Pixel Mapping

Please note: The following section is only applicable to simple screens i.e. screens where the total pixel count is less than 655360.

Nova Mars will warn if a screen with more than 655360 pixels is being attempted.

For HD or 4k LED screen programming please see the chapter below XXXXXXXXX.

Display Connection

The third tab of the Screen Config collection is the Display Connection Tab. This is where all the features used to pixel map an entire screen of panels is found.

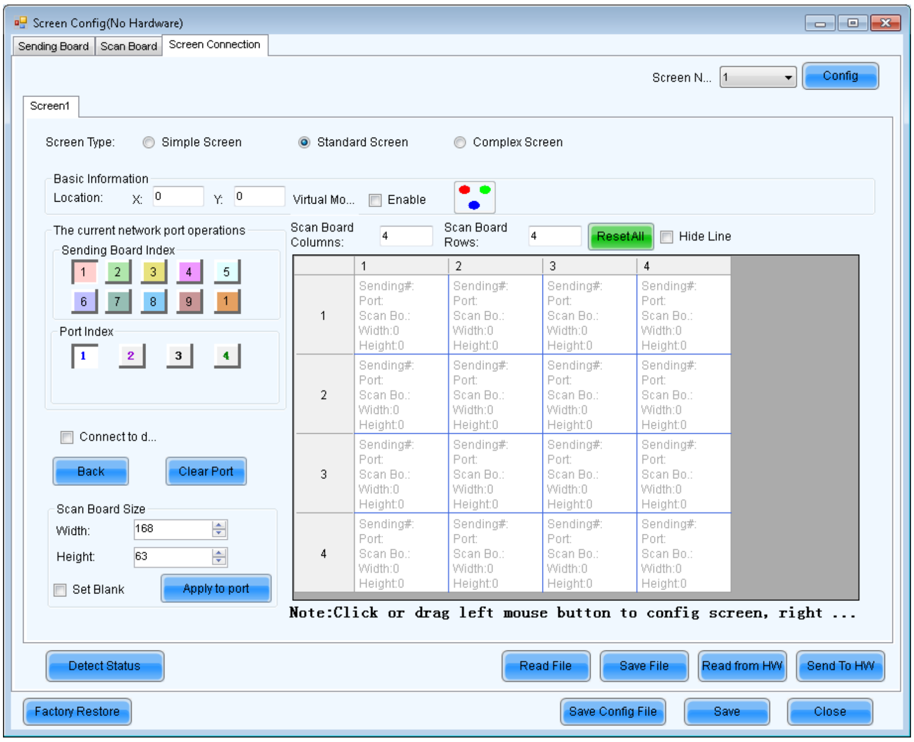

Figure 27 - The Display Connection Tab

Unlike the Scan Board Tab, almost all of the controls on this page are available to programmers and technicians.

A summary of their features is shown below:

Screen N...

Here the use can select how many LED screens are to be programmed from Nova Mars.

The default is 1 but be careful of remembered configurations from previous users if on a shared laptop.

For every value > 1 , and additional sub-tab will be displayed in the grid area of the window.

Details on how to program more than 1 screen at a time are given in the advanced section of this manual.

Screen Type:

digiLED recommends that the radio button for STANDARD SCREEN is selected as this is the version covered in all documentation.

If the software opens with this view:

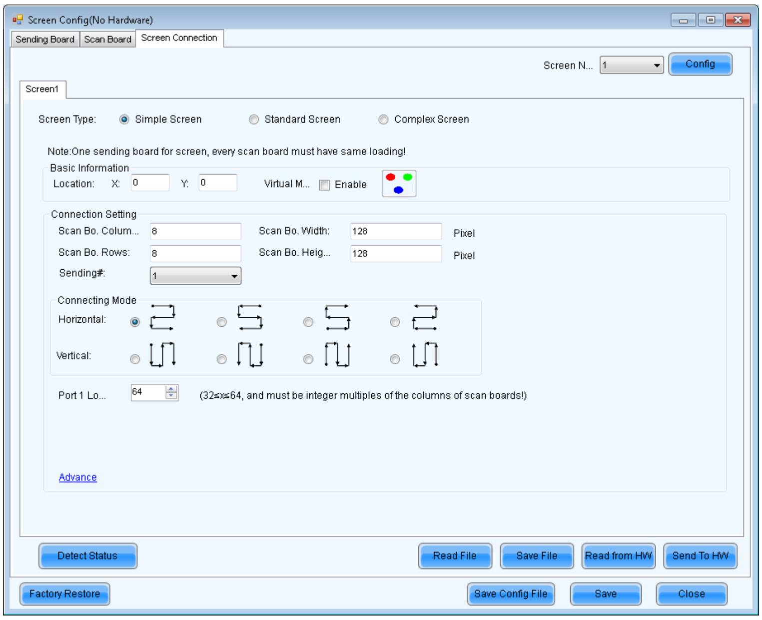

Figure 28 - Simple Screen View (do not use)

or this view:

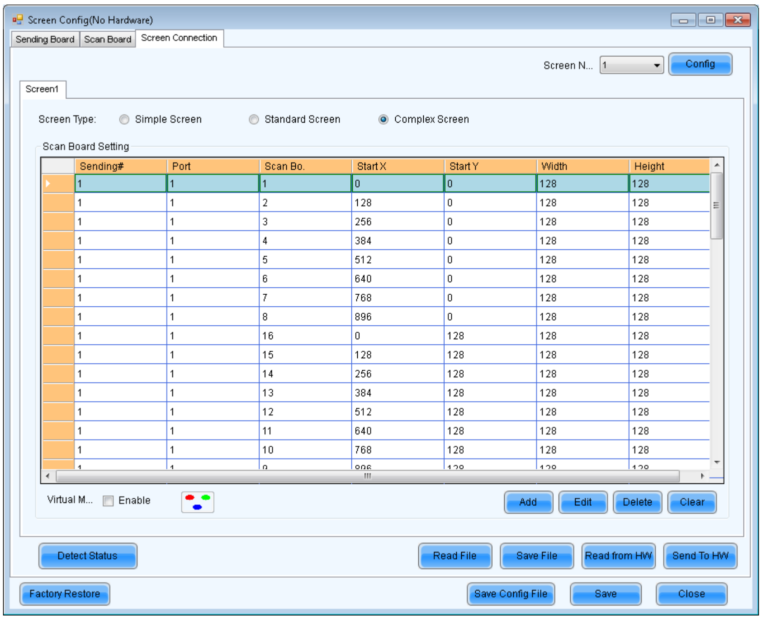

Figure 29 - Complex Screen View (do not use)

...the radio button at the top of the window marked STANDARD SCREEN should be selected to return to the default grid view.

Basic Information

In the basic information section, programmers can select an X, Y offset for the pixel map.

Working on a X, Y coordinate system for every pixel within a DVI signal, the two values describe how far from the top left of the image DVI to LED image capture should start.

While the default is 0,0 (meaning the top left of any computer desktop / DVI image will be displayed) Users can increase the horizontal offset of the displayed capture area by increasing the X value or increase the vertical offset by increasing the Y.

The Basic Information section relating to 'Virtual' or the RGB pixel icon is not discussed in this document as it relates to older style LED screens where the Red, Green and Blue LEDs of a pixel were separate entities.   This has been largely surpassed by the introduction of 3 in 1 RGB SMD pixels.

Current Network Port Operations

The current Network Port Operations describes how the programming data should be transmitted from the Navigator-NV (s) .

If for example, Sending Board Index = 1 and Port Index = 1 are selected, then all programming operation in the grid to the right will be transmitted out of Port 1 of the first Navigator-NV.

This section only comes into its own when the pixel count of a screen exceeds 655360 and multiple ports or Navigator-NV units have to be used to program large screens.

For simple screen programs, digiLED recommends that Sending Board Index = 1 and Port Index = 1 are selected.

In such a case the screen would be connected as follows:

Figure 30 - Navigator-NV Port 1 used to feed a small screen

Advanced, multi-port screens are discussed later in this document in the chapter XXXXXXXX.

Scan Board Size

This is probably one of the most critical section for a successful programming operation.

In the Scan Board Size, users should enter the exact pixel count of the LED panel type to be programmed.

This value can be obtained, either from the Spec Sheet of their product or from the Scan Board section of the software where it will be displayed in either the left or right section of the Scan Board tab (middle)

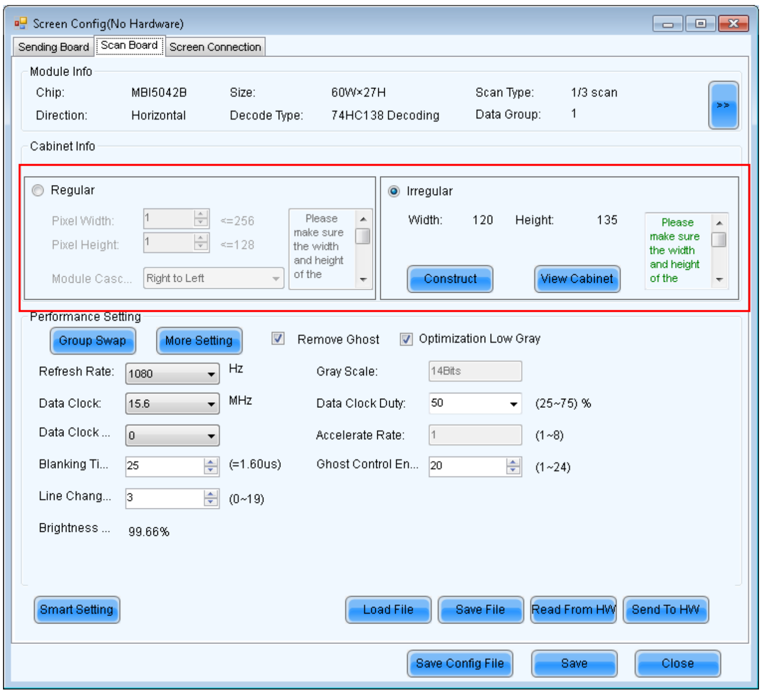

Figure 31 - Scan Board Tab area for displaying Pixel Count of a panel.

Once correct Scan Board Size data is entered, click APPLY TO PORT to use the values for continued programming.

A summary of some common digiLED panel pixel counts is shown below:

Product	X Pixel Count	Y Pixel Count
Toura 10	80	90
Toura 6	120	135
iMAG 5400	96	96
iMAG 4600	108	108
iMAG 3200	156	156
iMAG 2600	192	192
LT 10	64	72
LT6	96	108

Figure 32 - Common digiLED Panel Pixel Counts

Scan Board Columns, Scan Board Rows

The central section of the Display Connection Tab is the Scan Board Columns, Scan Board Rows programming grid.

In this grid, it is critical to note that the diagram is always shown VIEWED FROM THE FRONT of the LED screen.

Please remember this as cable planning and programming may caused a jumbled image if the wrong view is thought to be in use.

To program this section, first enter values in the SCAN BOARD COLUMNS, SCAN BOARD ROWS boxes that are equivalent to the screen size you are building.

Scan Board Rows is the same as LED Panels in a row.

Scan Board Columns is the same as LED Panels in a column[6].

For example, the following screen build would be entered as 3 , 3.

[6] True in 99% of LED panel types by may vary with extremely high resolution sub 1mm LED pixels.

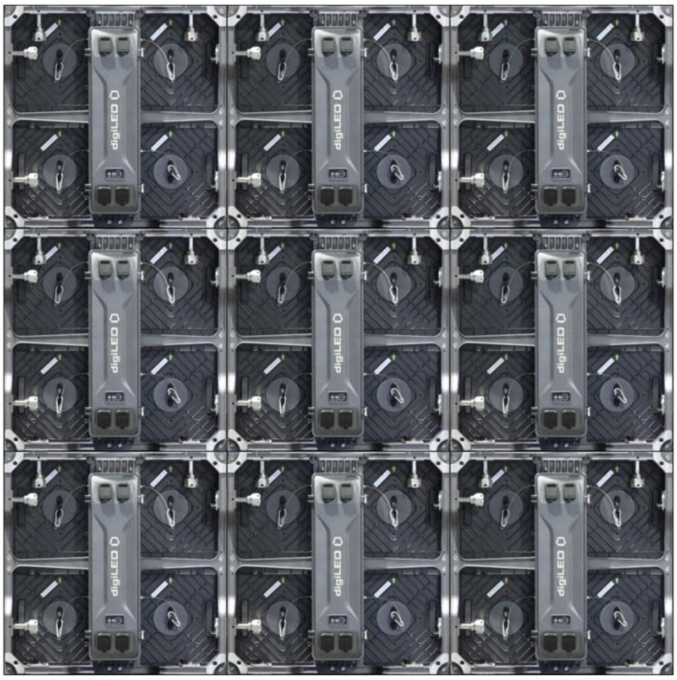

Figure 33 - a 3 wide, 3 high screen

The following would be entered as 4 , 2.

Figure 34 - a 4 wide, 2 high screen

Once the values for Scan Board Rows and Scan Board Columns have been entered, click RESET ALL to clear any previous programming data.

You should now see an empty grid of panels displayed on the computer screen.

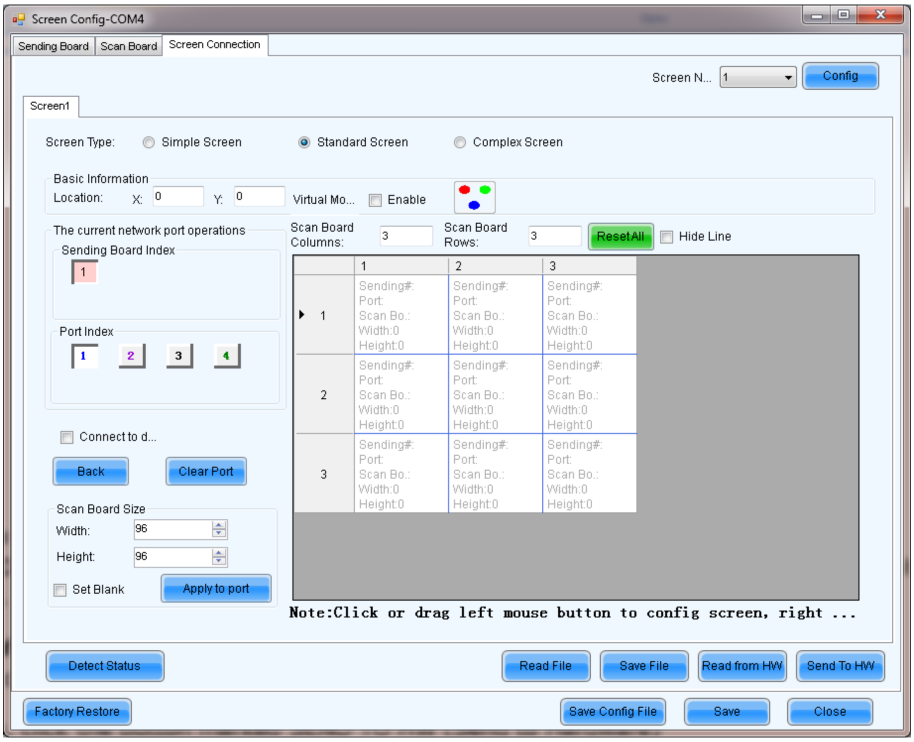

Figure 35 - Empty Grid of Panels

You may find it helpful at this stage to maximise the window to create a larger working space while programming. As with all Windows programs, to maximise the window, click the icon at the top right hand side of the window.

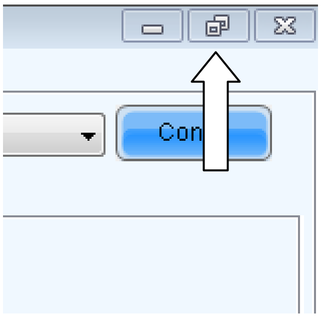

Figure 36 - the Windows Maximise Icon

To proceed with the screen programming at this point you now need to know two pieces of information about the way the screen was built:

- Where the Cat5 cable from the Navigator-NV plugs in
- What route the cable daisy-chains from panel #1 and onwards.

Please ask the technicians who built the screen for this information or scrutinise the back of the LED screen to ascertain both of the above answers.

Please also remember that programming operation in Nova Mars are always undertaken from the FRONT VIEW of the screen. As such, if a real-world screen is cabled as follows:

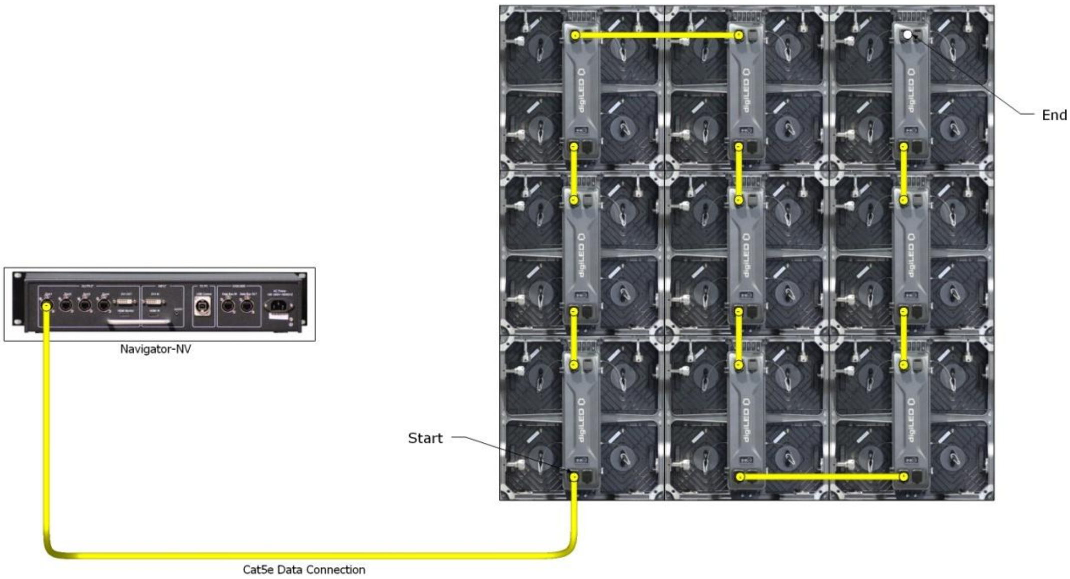

Figure 37 - Real-World Cat5e Cable Route

...the display connection grid of Nova Mars should be drawn as below:

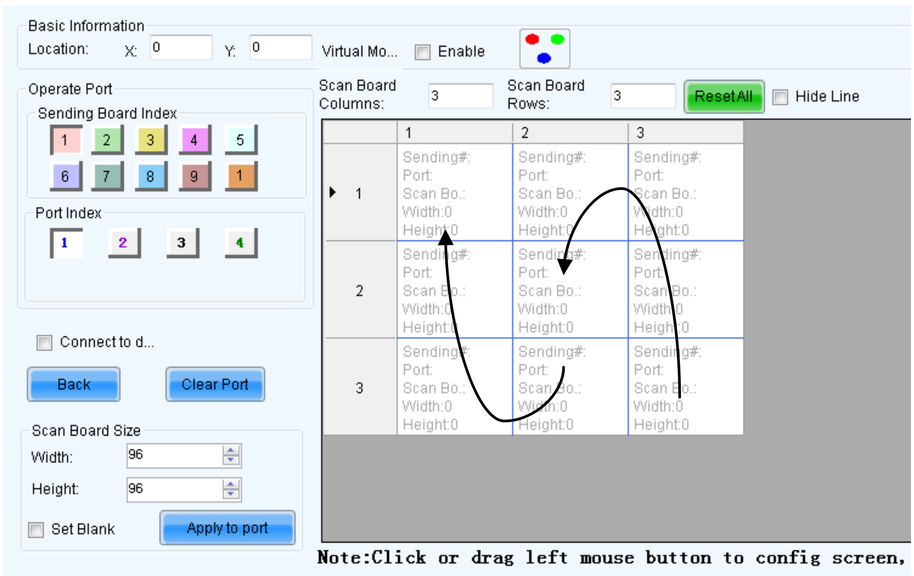

Figure 38 - Display Connection Route for 3 x 3 screen

Please note the S and E of the cable route denoting Start and End.

To draw this cable route in Nova Mars, please use single left mouse clicks to add panels to the route one at a time.

First, click on the panel in position 3,3. An S will appear denoting start.

Now click on the panel one above (3,2). A green line will connect the two panels denoting the 1st hop of the Cat5 daisy chain.

Now click on the panel above that (3,1). The green line will be extended to this panel.

Now click on the panel to the left of 3,1 (panel 2,1). The green line will be extended to that panel.

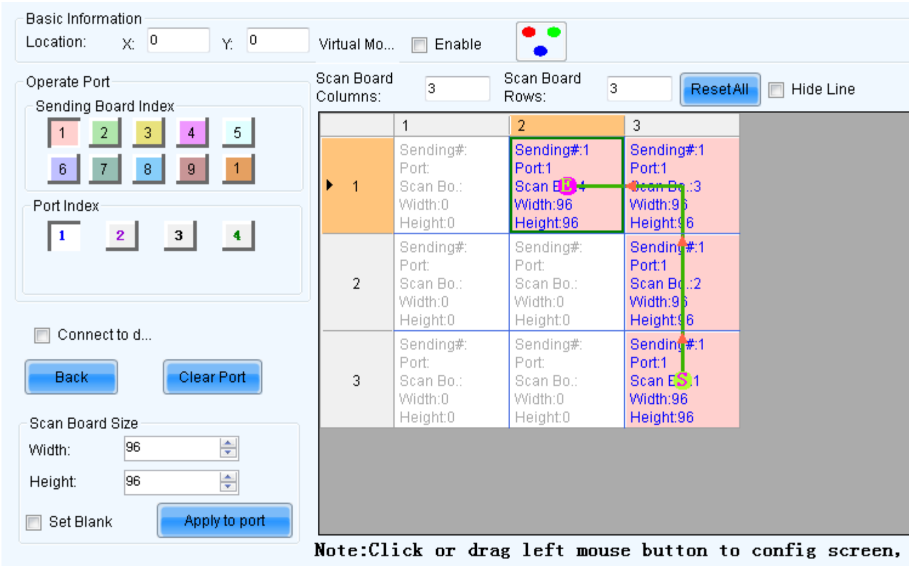

Figure 39 - Partially completed click-through.

With each click, please note that the E symbol moves to the last-clicked panel denoting the new END to the cable daisy-chain.

Please also not that for every new click, a panel changes from pink to white and the value for "Scan Bo.." increases by 1.

Continue to click through the entire grid of panels until all panels are pink.

Once complete, the grid should appear as below:

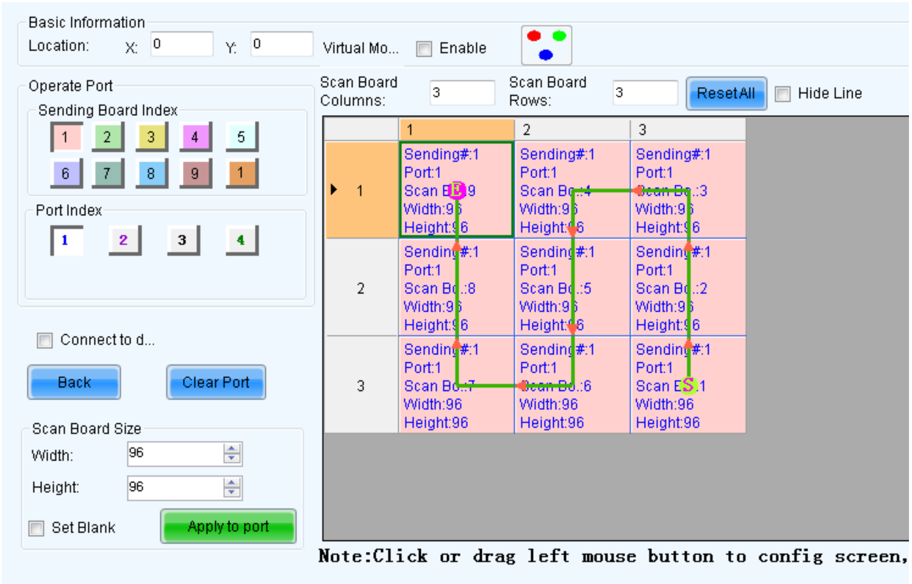

Figure 40 - The Completed Grid

Mistakes when Clicking

Unlike LED Studio, Nova Mars has the advantage that a click in the wrong place can be easily corrected.

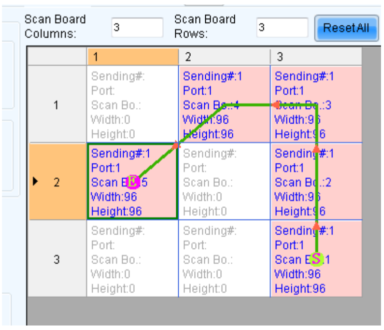

Figure 41 - Click Mistake !

In the above example, the panel at location 1,2 has been mistakenly clicked too early.

To correct this simple RIGHT click on the panel 1,2 and the connection will be removed.

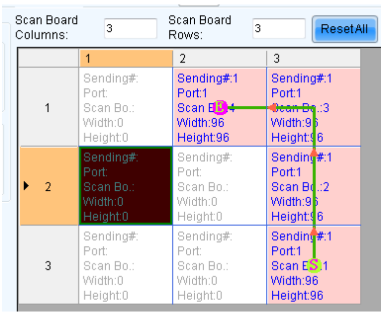

Figure 42 - Click Fixed !

Send and Save
Once the click-through of the grid is completed, the data must now be Sent and Saved.

To do this, click the button marked SEND TO HW (Send to Hardware)

Within seconds, the screen should be pixel mapped as per the design.

To make the setting permanent, click the SAVE button to write the setting to memory.

Please note, do not confuse the SAVE button with the SAVE FILE and SAVE CONFIG FILE button. At this stage, these instructions refer purely to the SAVE button.

Configuration Saving
As mentioned above, two further types of save button exist on this page:

- Save File
- Safe Config File

Save File will take the design of cable route you have just designed and allow this to be archived in a .scr file on the PC or laptop.

Save Config File will not only capture the cable route just designed but also the parameters from the Scan Board Tab and the Sender Tab as well. The Save Config File will create a .scfg file for archiving on the PC / Laptop used for programming.

digiLED recommends that both these file save types are used once a programmer is happy with the completion of a screen configuration / programming operation.

This completes the simple screen programming section.

Day to Day Screen Operations

Image Adjustment

Brightness

When running, the main window of Nova Mars LCT appears as below:

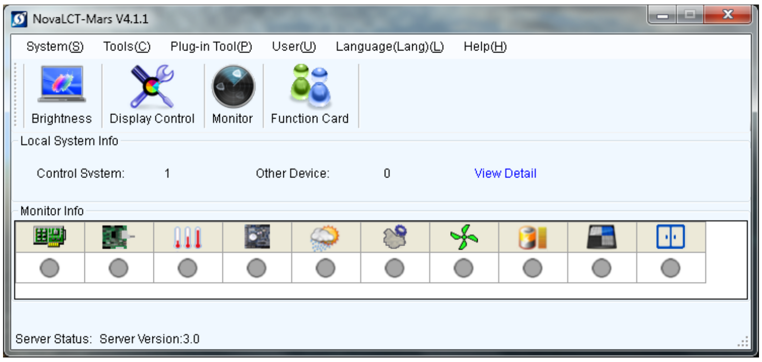

Figure 43 - Nova Mars Main Window

There is no need to login to the advanced section to access brightness control of the screen.

To access the brightness control from the main window of Nova Mars LCT, click on the top left icon labelled BRIGHTNESS.

The following window will be displayed:

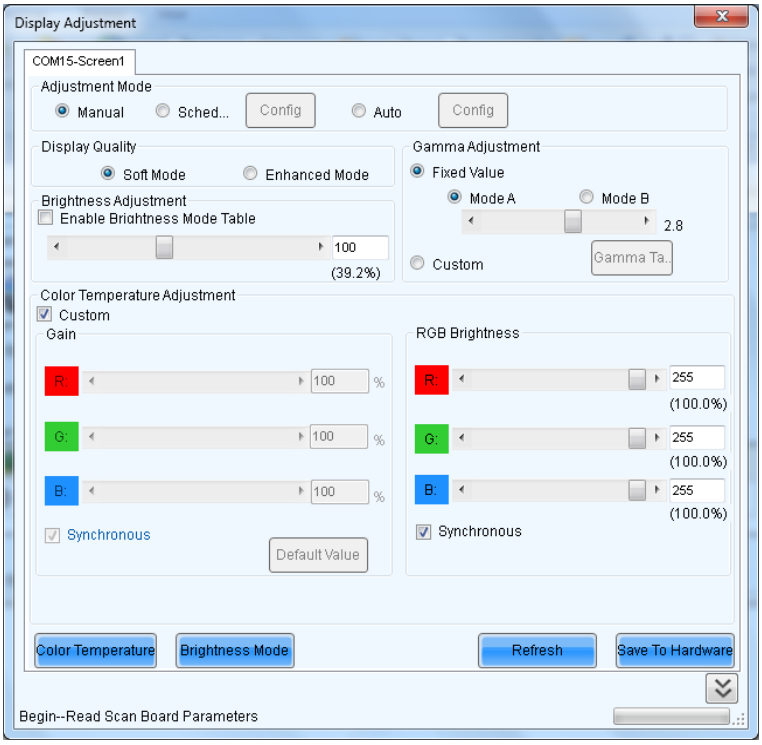

Figure 44 - The Brightness Settings Window

The brightness of the LED screen can now be adjusted using the brightness slider:

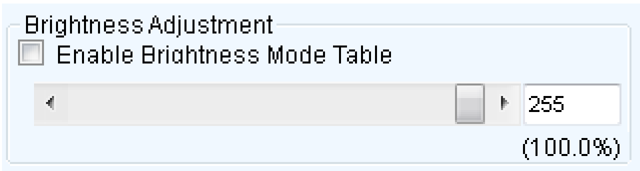

Figure 45 - the LED Brightness Slider

Please note - it is also possible to adjust the brightness slider using the cursor keys on the computer keyboard.

Once an appropriate brightness has been selected, click the SAVE TO HARDWARE button on the bottom right to make the setting permanent.

Contrast

Contrast cannot be set using Nova Mars LCT.

Gamma

Gamma can be set in Nova Mars by entering the Brightness Settings Window as described above.

The top right area of the window has controls for gamma adjustment:

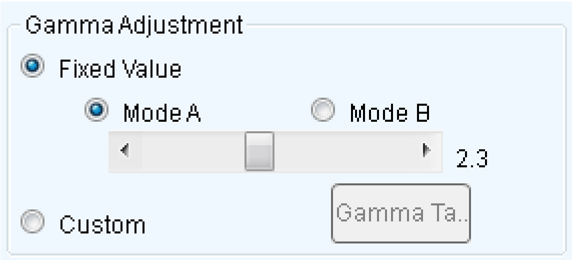

Figure 46 - Gamma controls in the Brightness Adjust Window

For the purposes of this manual, displayLED only recommends using FIXED VALUE and MODE A with the slider control.

When the Gamma has been adjusted to the desired level, click SAVE TO HARDWARE to make the changes permanent.

Saturation

Saturation cannot be set with Nova Mars LCT Software. It is however available from the front-panel TCAB controls of a digiLED Navigator-NV Process. Please see the Navigator-NV manual for further details on this function.

Hue

Hue cannot be set with the Nova Mars LCT software. It is however available from the front-panel TCAB controls of a digiLED Navigator-NV Process. Please see the Navigator-NV manual for further details on this function.

Red Channel Brightness

Red channel brightness can be set from the Brightness Adjust Window of Nova Mars LCT. To enter the Brightness Adjust Window, repeat the steps described above.

Once in the window, the lower right area of the window has controls for Red, Green and Blue Channel Gain.

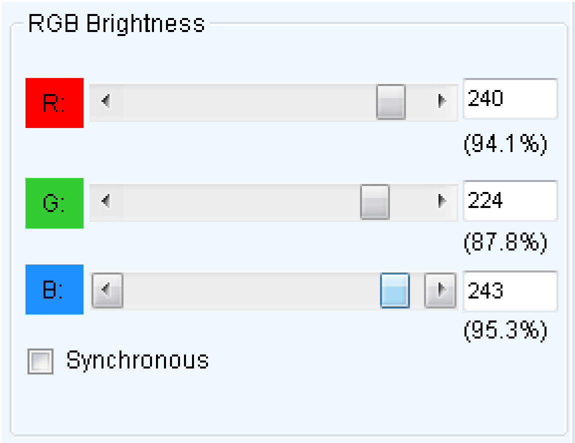

Figure 47 - Red, Green and Blue Channel Brightness

If you wish to adjust Red, Green and Blue independently, untick the box labelled SYNCHRONOUS. The Red Channel Brightness can now be adjusted with a mouse on the slider or by highlighting the Red slider and using the keyboard cursor keys.

The value in the box is an 8 bit value.

The value underneath is a percentage value.

When the Red Brightness has been adjusted to the desired level, click SAVE TO HARDWARE to make the changes permanent.

Green Channel Brightness
Green Channel Brightness is accessed in the same was a Red Channel Brightness but using the Green slider instead.

Blue Channel Brightness
Blue Channel Brightness is accessed in the same was a Red Channel Brightness but using the Blue slider instead.

Colour Temperature
By altering the Red, Green and Blue channel brightness levels as described above, you are, in effect, altering the colour temperature of a screen.

From Nova Mars version 4.2.X onwards, there as also been the option to combine these into a single slider control.

To access this control click the NORMAL MODE button below the RGB sliders.

The sliders will now change to a single combined Colour Temperature slider.

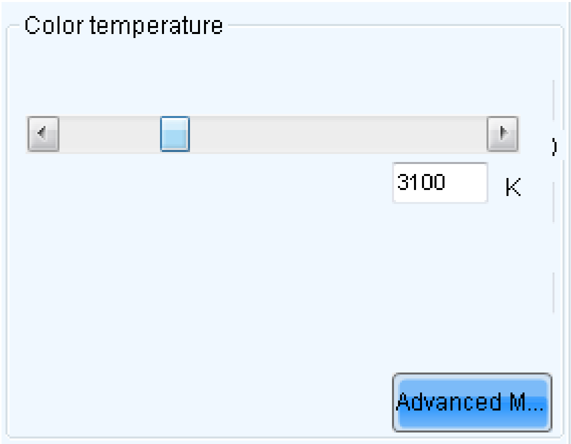

Figure 48 - the single-slider Colour Temperature Control

Move the slider to the left to select a warm colour temperature (lots of red in the whites). Move the slider to the right to select a cool colour temperature (lots of blue in the whites).

When the correct colour temperature has been set, finalise the procedure by clicking SAVE TO HARDWARE to make the changes permanent.

Advanced Image Adjustment

In addition to the regular image adjustment listed above, further (advanced) controls are available from other sections of Nova Mars.

While users may not need to use these advanced controls, they should be aware of their location in case previous users of the laptop or software have applied colour adjustments from this section.

In particular, the default mode of operation (with colour restore disabled) should be checked in cases where strange colour artefacts are seen on LED screens.

Colour Restore

The Colour Restore Window is accessed from the TOOLS menu in the top level of Nova Mars.

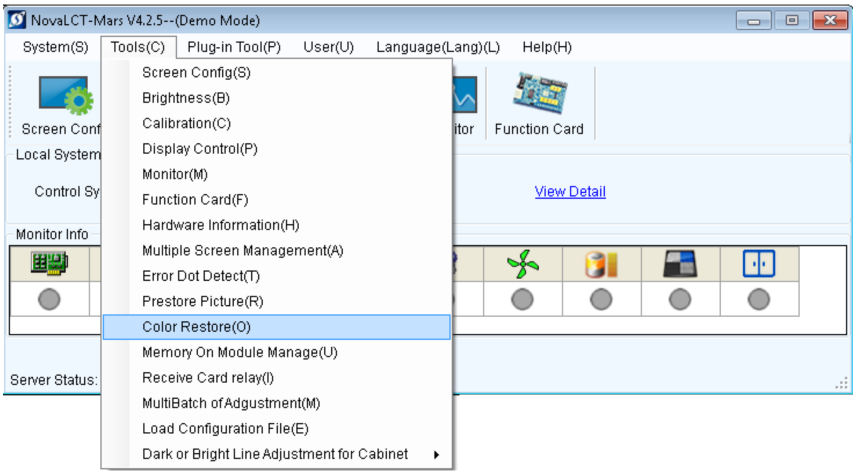

Figure 49 - Colour Restore in TOOLS menu

Once clicked, the following window will open:

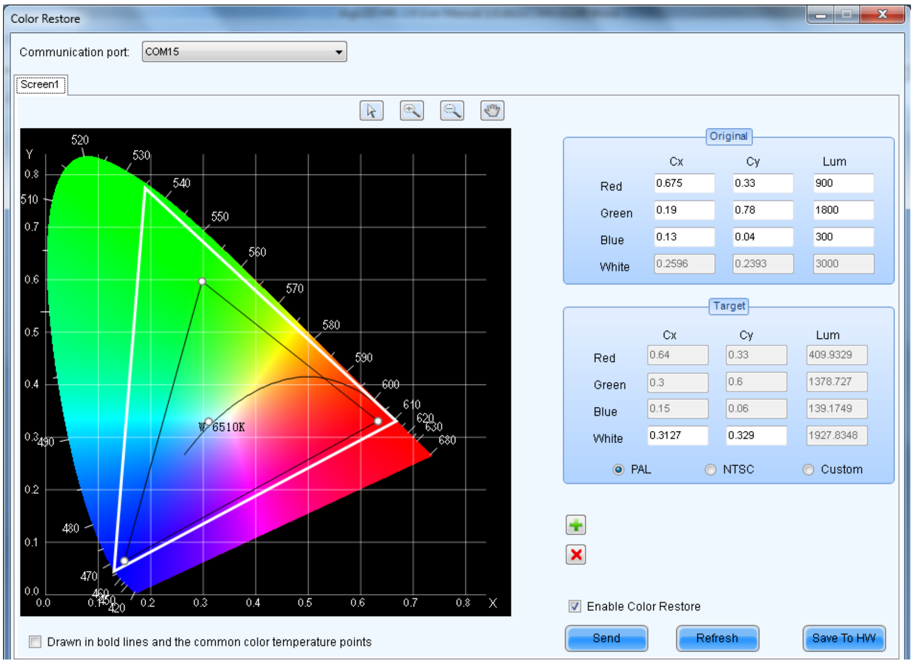

Figure 50 - Colour Restore

Within this window, an IEEE Colour Gamut is displayed to the left including the white colour temperature line.

To the right, Original and Target matrices are displayed for numeric alterations to the colour gamut.

Recommendations

digiLED recommend s that for 99% of screen users and programmers, Colour Restore is disabled.

While the tool *can potentially* be used to set broadcast accurate colour space on an LED screen, the parameters that need to be entered to render the tool accurate are normally beyond the scope of most LED installations or rentals.

Instead of Colour Restore, digiLED advises users and programmers to use the RGB sliders, gamma and colour temperature controls detailed in previous chapters to adjust the image on the LED screen.

Enable / Disable

To enable Colour Restore, tick the tick box above the SEND button and click SEND.

To disable Colour Restore, untick the same box and click SEND.

To make either selection permanent, click the SAVE TO HW (Save to Hardware) button.

Correct Use of Colour Restore

On the right hand side of the Colour Restore Window are two number matrices.

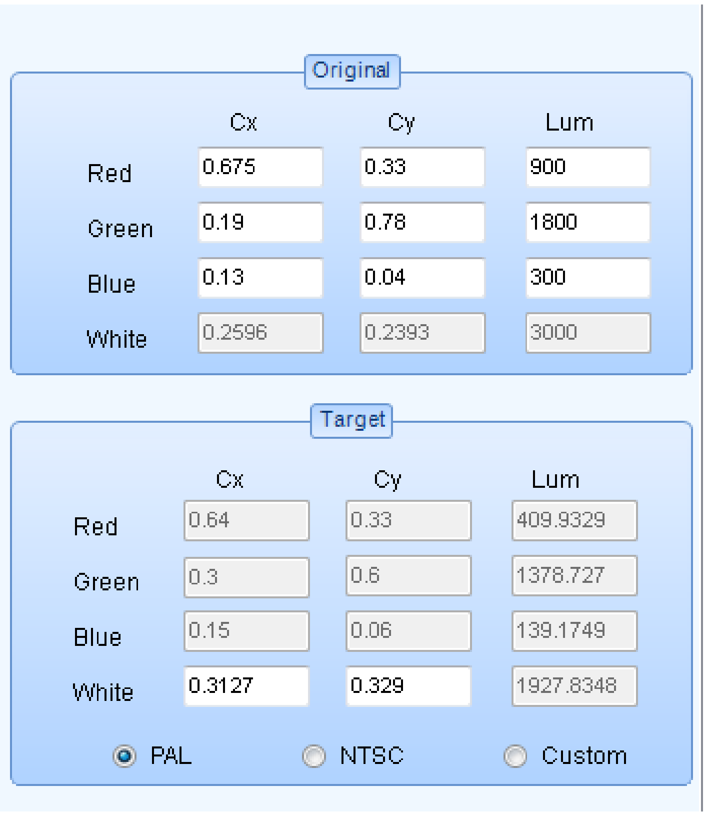

Figure 51 - Colour Restore Colour Coordinate Matrices

By entering the manufacturers data from the LED chip supplier into the upper matrix (Original), the desired colour gamut of the LED screen can be numerically set in the lower matrix (Target).

In addition to the numeric value features of the lower matrix, two presets are available for colour coordinates : PAL and NTSC.

With PAL or NTSC selected (and with accurate data entered into the upper matrix), the digiLED screen in question will display a precise, industry-standard colour-space when Colour Restore is set and enabled.

Please see Wikipedia for further information on PAL or NTSC colour space.

https://en.wikipedia.org/wiki/Color_space

Test Patterns

Test patterns for use on digiLED LED Panels can be generated in two places within Nova Mars.

- The Desktop and DVI signal of the PC or Laptop running Mars
- The Scancard within every LED panel.

They can be triggered as follows.

Laptop / PC Generated Patterns

A sub-program of Nova Mars called Test Tool can be used to generate various test patterns via the graphics card of the Laptop running Nova Mars.

Due to the patterns being generated in the Windows desktop environment and Laptop graphics card, it is essential an HDMI or DVI connection is in place between Laptop and Navigator-NV processor.

To access Test Tool, select this option from the PLUG IN TOOL(P) menu within Nova Mars.

At the time of writing, Test Tool is only available with Chinese language options:

Figure 52 - Test Tool (Chinese Language Set)

Further information on Test Tool will be published in later versions of this manual.

Scancard Generated Patterns

An alternative to Laptop and graphics card generated patterns is the Scancard Test Pattern Generator.

Please note, the Scancard Test Pattern Generator is not suitable for testing the video circuits or video transmission from a Navigator-NV. Instead, it simply proves that commands are being passed from Nova Mars to the Scancards and the Scancards can execute the internal test pattern generator function.

Even so, the test functions still prove very useful for checking Pixel integrity etc on the surface of the LED panel.

The Scancard Test Patterns are accessed via the TOOLS menu of Nova Mars.

Within the TOOLS menu, select DISPLAY CONTROL (P).

The following window will be displayed.

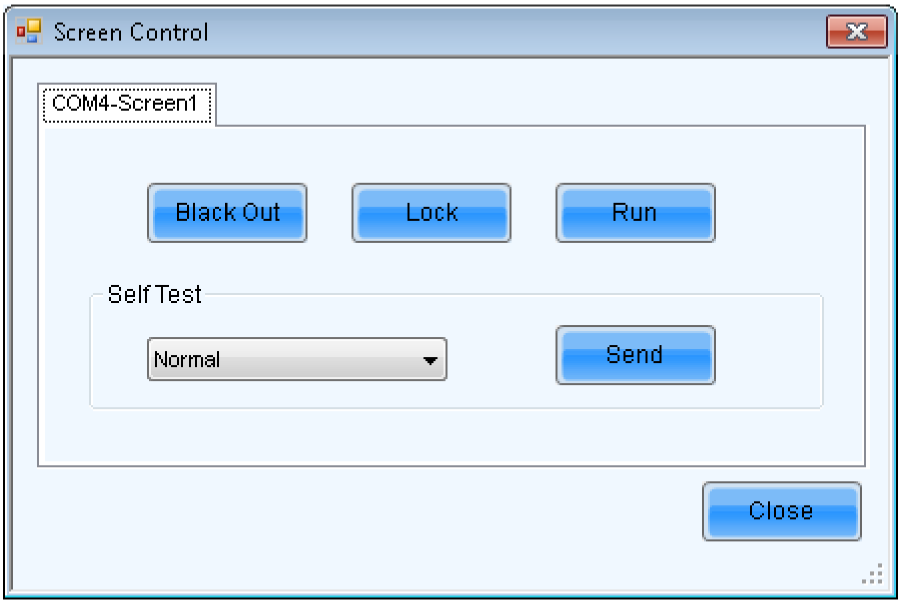

Figure 53 - Scancard Generated Test Pattern Control

Use the SELF TEST dropdown menu to select which type of test pattern should be displayed.

Click SEND to transmit the command to all Scancards within the screen.

The list of available test patterns is as follows:

- Pure Red
- Pure Green
- Pure Blue
- 100% White
- Horizontal Scrolling Lines
- Vertical Scrolling Lines
- Diagonal Scrolling Lines
- Greyscale Ramp
- Time Variable Brightness Ramp

To cancel the Test Patterns, select NORMAL from the Self Test List and confirm by clicking SEND.

Freeze Frame and Blackout

From the same menu as described above, two further selections are also available for screen image control.

Clicking BLACKOUT will instantly send the entire LED screen to Black.

To cancel Blackout, click the RUN button.

To cause an image freeze frame, click the LOCK button.

To return the screen to normal operation click the RUN button.

Please Note: A stable Freeze Frame image may well be interrupted by the disconnection of the HDMI or DVI image source feeding the Navigator-NV.

As an alternative to this, please see the chapter on Prestore Picture below.

Signal Loss Behaviour

Nova Mars includes a number of features that allow the user to configure the way an LED panel behaves on loss of signal.

These can be found by entering the TOOLS menu and selecting PRESTORE PICTURE.

Prestore Picture

As mentioned above, Prestore Picture can be found by entering the TOOLS menu and selecting PRESTORE PICTURE.

The following window will be displayed:

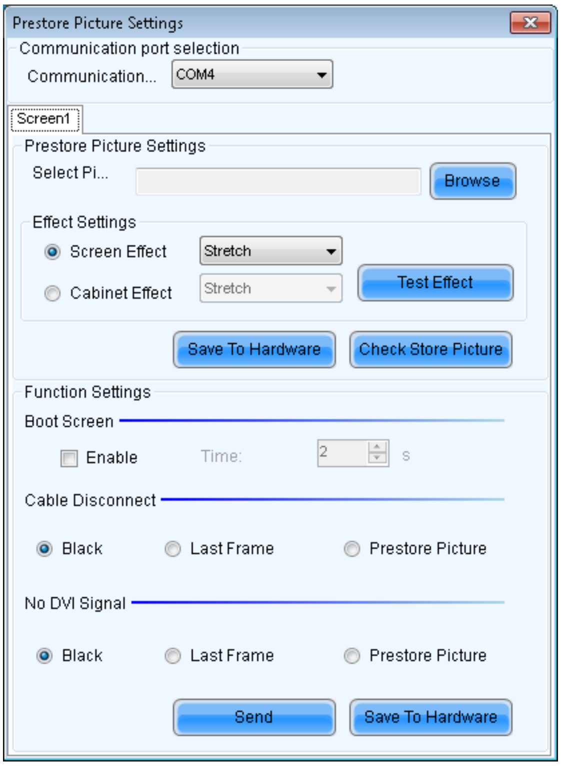

Figure 54 - The Prestore Picture Window

Two sections of this window control the signal loss behaviour of the LED panels as detailed below.

Cable Disconnect
In the Prestore Picture Window, three options can be chosen for LED panel behaviour in the event of a Cat5e / digiDATA signal loss.

- Blackout (Black)
- Freeze frame on the last good frame of the video (Last Frame)
- Previously uploaded image display (Prestore Picture)

While the first two items are self explanatory, please see the section below to program and upload an image file to each and every Scancard within a screen (Prestore Picture).

No DVI Signal
In the Prestore Picture Window, three options can be chosen for LED panel behaviour in the event of a DVI (or HDMI) signal loss.

- Blackout (Black)
- Freeze frame on the last good frame of the video (Last Frame)
- Previously uploaded image display (Prestore Picture)

While the first two items are self explanatory, please see the section below to program and upload an image file to each and every Scancard within a screen (Prestore Picture).

Prestore Picture Settings
If option 3 is chosen for either the loss of digiDATA or the loss of DVI signal, Nova Mars needs to be configured to display the correct image when Prestore Picture is triggered.

The still image chosen for Prestore can be instructed to display across the entire LED screen surface or to be repeated across each and every LED panel within the screen.

The former may be useful at an even where (for example) a sponsors logo / splashscreen could be uploaded as the Prestore picture.

The latter may be useful where an LED rental company may wish to brand its fleet of LED panels with their company logo for promotional reasons during the rig of a rental screen.

Whole Screen Image
Select the radio button marked SCREEN EFFECT to upload a Prestore Picture that will be displayed across the entire LED screen.

Click the BROWSE button to select an appropriate file from your laptop or PC and click SAVE TO HARDWARE to upload the still image.

Finalise the process by making your selection from the Cable Disconnect or No DVI section and click SEND.

To make the settings permanent, click SAVE TO HARDWARE.

This completes the whole screen image Prestore Picture settings.

Cabinet Effect
Select the radio button marked CABINET EFFECT to upload a Prestore Picture that will be displayed and repeated across every panel of the LED screen.

Click the BROWSE button to select an appropriate file from your laptop or PC and click SAVE TO HARDWARE to upload the still image.

Finalise the process by making your selection from the Cable Disconnect or No DVI section and click SEND.

To make the settings permanent, click SAVE TO HARDWARE.

This completes the Prestore Picture settings for repeating an image on every panel.

Image File Formats
Prestore Pictures can be uploaded to Nova Mars in the following formats:

- .bmp
- .jpg
- .png

Tile, Stretch, Centre
When uploading a Prestore Picture, the options of Tile, Stretch or Centre can be selected.

When Tile is selected, the image will be repeated again and again if the LED screen or LED panel is larger in pixel dimensions than the uploaded image.

When Stretch is selected, the image will be scaled up or down in both width and height until it completely fills the LED screen or LED panel. Caution - this may cause image distortion as aspect ratios can be affected.

When Centre is selected, the centre pixel of the image will be placed on the centre pixel of the LED panel or screen. The size of the image will not be altered so a too-small image will result in black areas around the image. A too large image will result in the outer edges not being displayed on the LED screen or panel.

For the highest quality Prestore Picture result, images should be created with the exact same pixel count as the LED screen or panel.

Tile should then be selected for the image upload.

LED Panel Boot Options
A further use for the Prestore Picture is possible with the BOOT SCREEN setting.

By configuring the Boot Screen setting, an LED screen or panel can be made to display the Prestore Picture for a given time when the LED panels are first powered up.

This may be particularly useful for rental companies wishing to brand their LED rental panels.

Advanced Programming and Screen Configuration

The following section is aimed at screen programmers who have a sound understanding of the basic operation with Nova Mars.

digiLED advises that users should not attempt any operation in this section unless they have fully read and understood the basic screen programming principals.

High Resolution HD Screen Programming

As mentioned in the basic screen programming section, the pixel capacity of a single Cat5e cable is 655360 pixels.

While this is no issue for small screens, larger screen can easily exceed this pixel count.

An HD screen for example has 1920 x 1080 pixels, a total of 2,073,600 !

It is therefore necessary when constructing larger screens to split the pixel load across multiple Cat5e cables, ensuring each individual cable never exceeds 655360.

Typically an HD screen would be split into quarters.

This can be done in either horizontal stripes, vertical columns of quadrants as shown below:

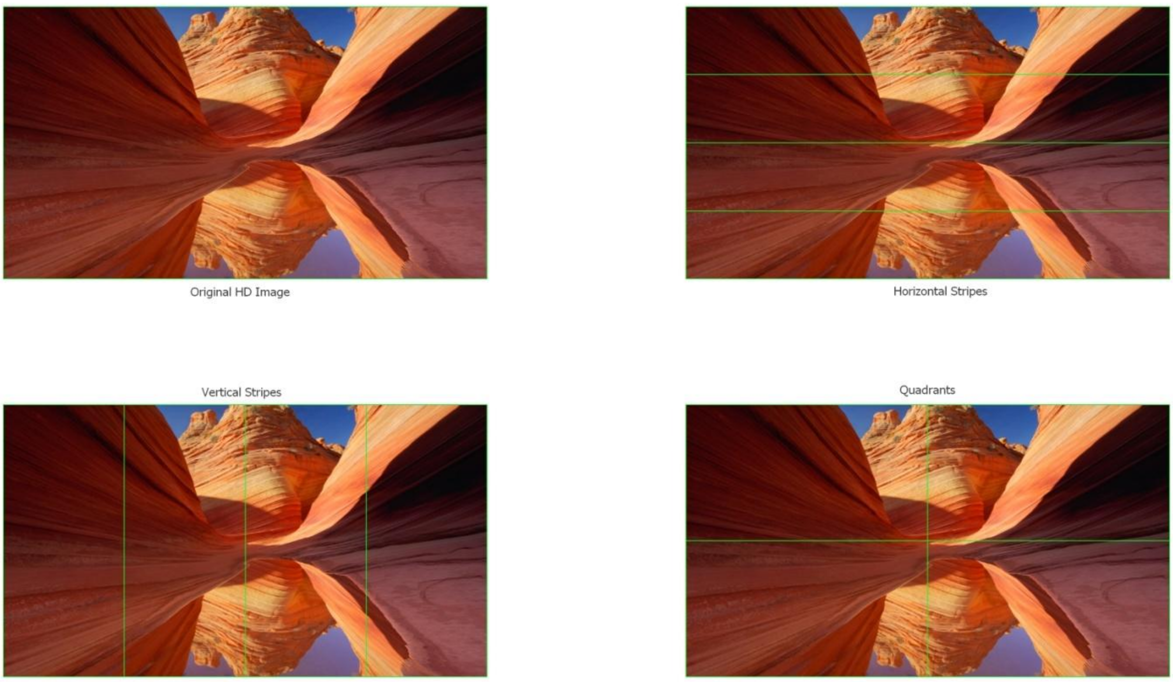

Figure 55 - HD Screens Quatering

The technicians building the screen should be instructed to treat each quarter as an isolated daisy-chain of Cat5 digiDATA.

A Navigator-NV would then be connected to the four quarters as follows:

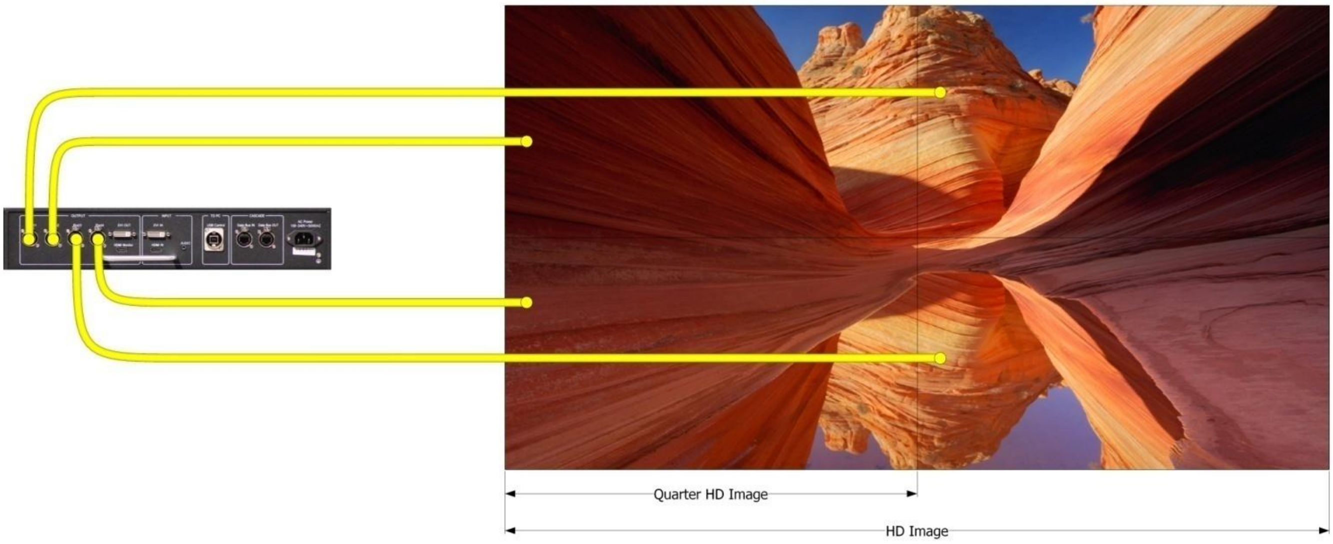

Figure 56 - Navigator-NV using 4 Ports for HD Screens

Of course, connecting the Navigator-NV is only half of the process. The screen needs to be pixel mapped as well. This is detailed below:

HD Screen Pixel Mapping Example 1

In this example a 16 x 8 Toura 6 screen is to be pixel mapped enabling a full HD surface of LED screen to be displayed.

As stated previously, the screen needs to be cabled in quadrants to ensure that no Port or Cat5 cable exceeds its pixel capacity.

In this example the screen is cabled as below:

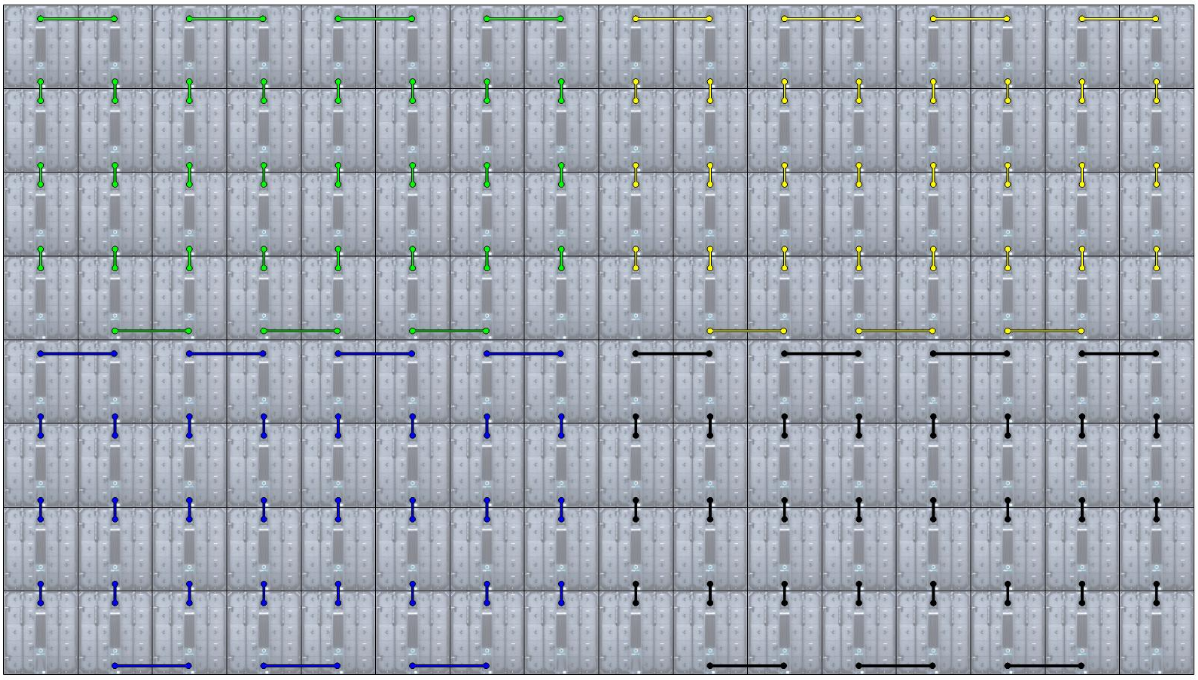

Figure 57 - 16 x 8 Toura 6 Screen Cabled in Quadrants

In the example, for illustration purposes the 4 Cat5 zones are coloured Green, Yellow, Blue and Black.

By cabling this way, each Port / Cat5 cable is responsible for 8 x 4 panels of LED screen.

The total pixel count on each cable is therefore

$$8 * 4 * 120 * 135 = 518400 \, Pixels$$

Since 518400 is less than 655360, this cable method is compliant with the capacity limitations on Ports and Cables.

The 4 quadrants of Toura6 would then be connected to the Navigator-NV as follows:

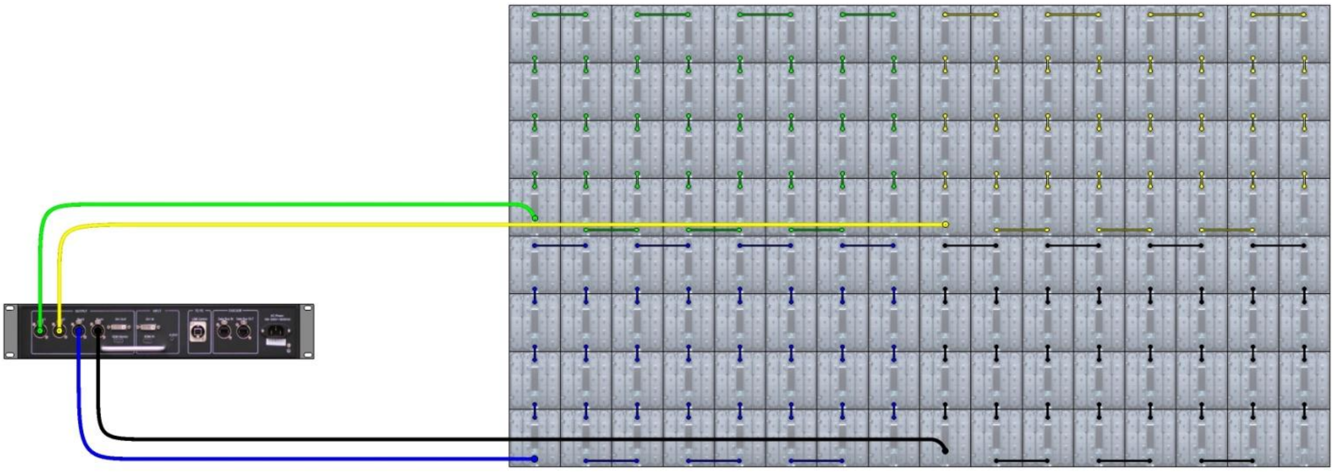

Figure 58 - 4 Port Navigator-NV Connection to Toura Quadrants

Having completed the cabling of the screen, the screen now needs to be programmed using Nova Mars.

HD Programming Prerequisites

Given that the Toura6 screen in this example has an LED pixel resolution of 1920 x 1080 it is essential that the EDID settings of Nova Mars are also set to 1920 x 1080 or greater.

In addition, if the DVI signal is being supplied by an Image Pro or similar, it is also essential that the Image Pro is outputting 1920 x 1080 or greater.

While this may sound obvious, it is worth remembering that inside a Navigator-NV there is no scaling capability.

Without scaling, if your DVI source does not have enough pixels, your LED screen image will also not have enough pixels.

Remember : Once your EDID settings have been changed in the SENDER tab, please click SET and SAVE.

HD Programming

Enter the SCREEN CONFIG section of Nova Mars and click on the third tab labelled SCREEN CONNECTION.

With the example screen having 16 x 8 panels, enter values of 16 and 8 in the SCAN BOARD COLUMNS, SCAN BOARD ROWS boxes.

Now click RESET ALL to ensure the design grid is cleared of any previous programming.

The example screen is built with digiLED Toura6 LED panels which have a pixel resolution of 120 x 135.

Consequently, enter values of 120 , 135 into the SCAN BOARD SIZE box at the lower left of the SCREEN CONNECTION window.

Above this, click the button for PORT 1 and then click APPLY TO PORT.

It may also be helpful at this time to maximise the SCREEN CONNECTION window so that the entire grid of panels can be seen.

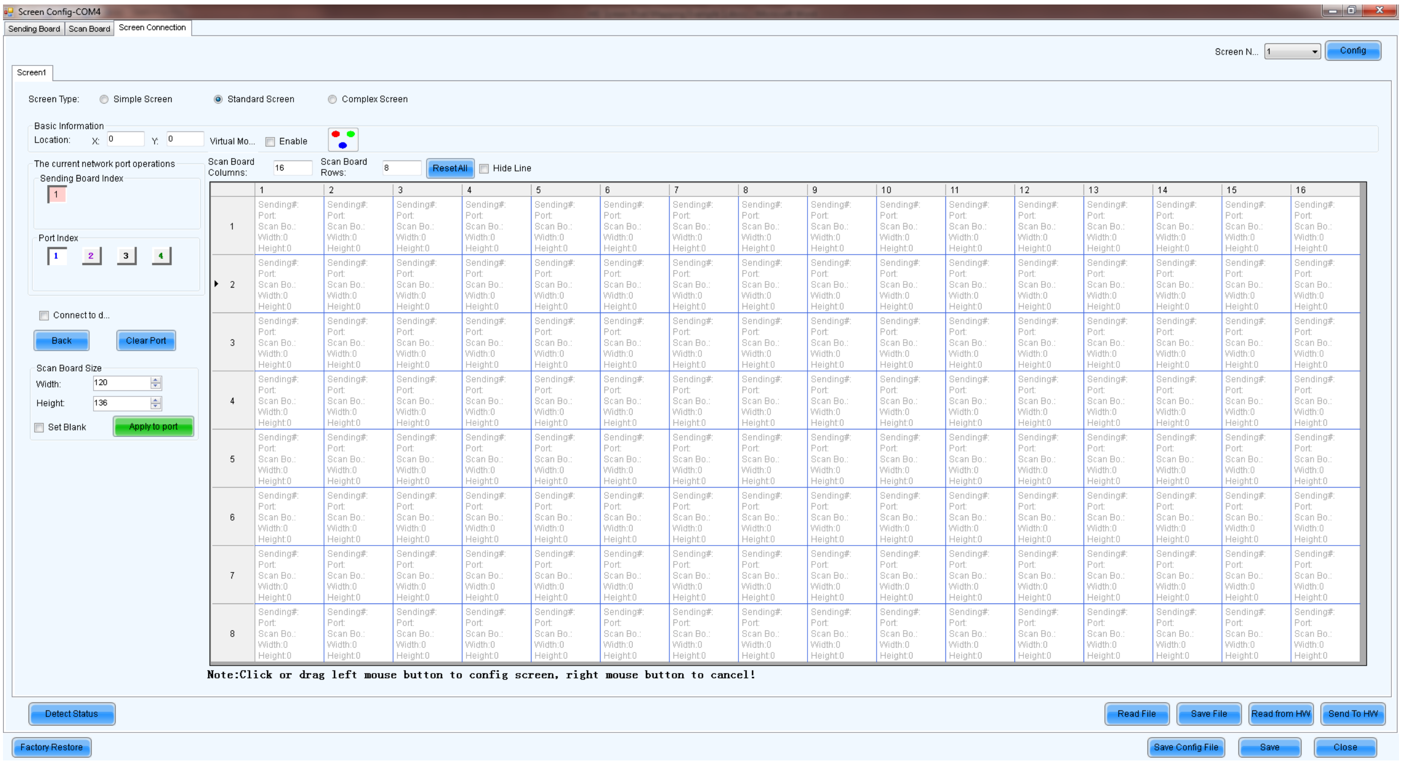

Figure 59 - Empty 16 x 8 grid of panels

Caution - The diagrams drawn above illustrate the back of the Toura6 screen. Programming operations take place from the front view ! Due to this, the panel at coordinate 16,4 is the first to be programmed.

Checking that PORT INDEX 1 is highlighted and that the SCAN BOARD SIZE is set to 120,135, click on the panel at location 16,4.

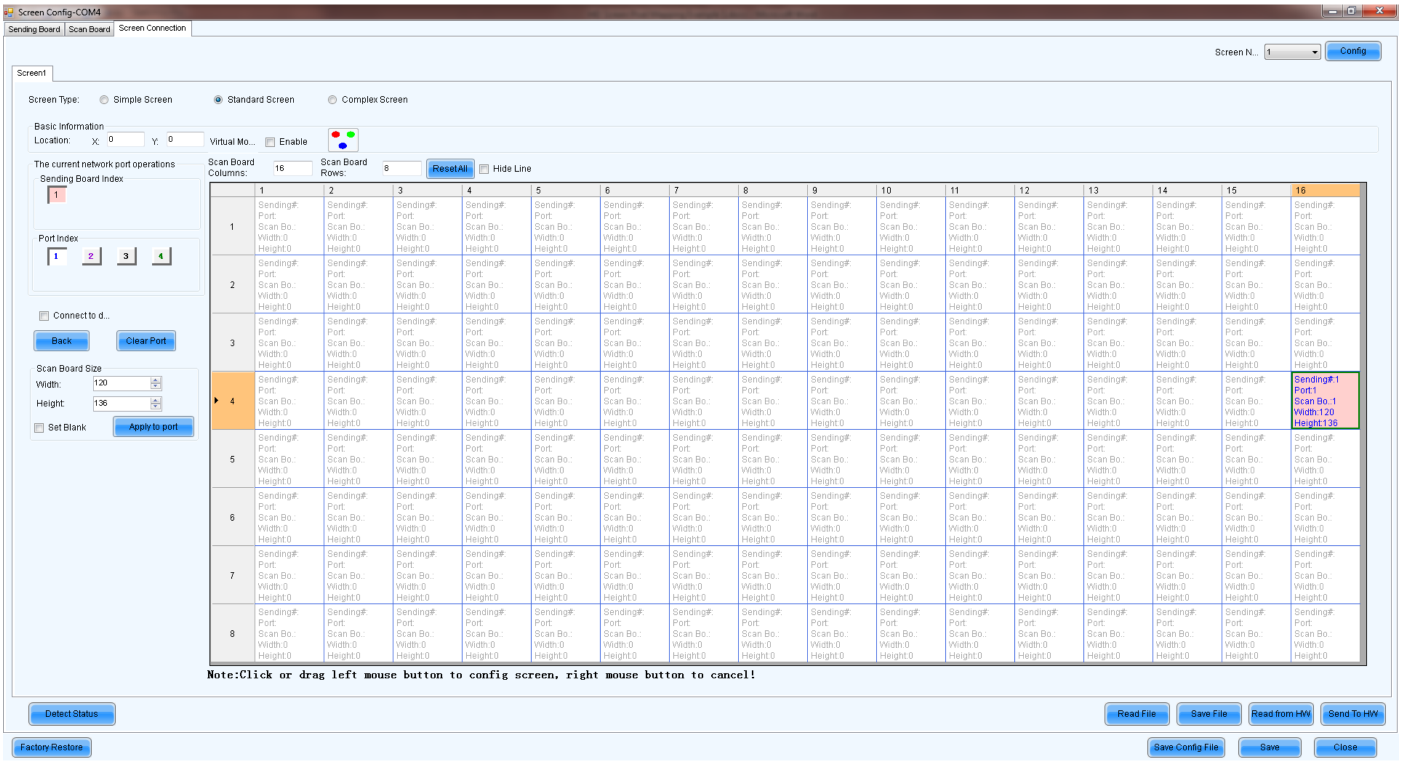

Figure 60 - Panel 16,4 selected as the first panel of Port1

Now click-through the remaining panels within that quadrant of the screen until the entire zone has been connected.

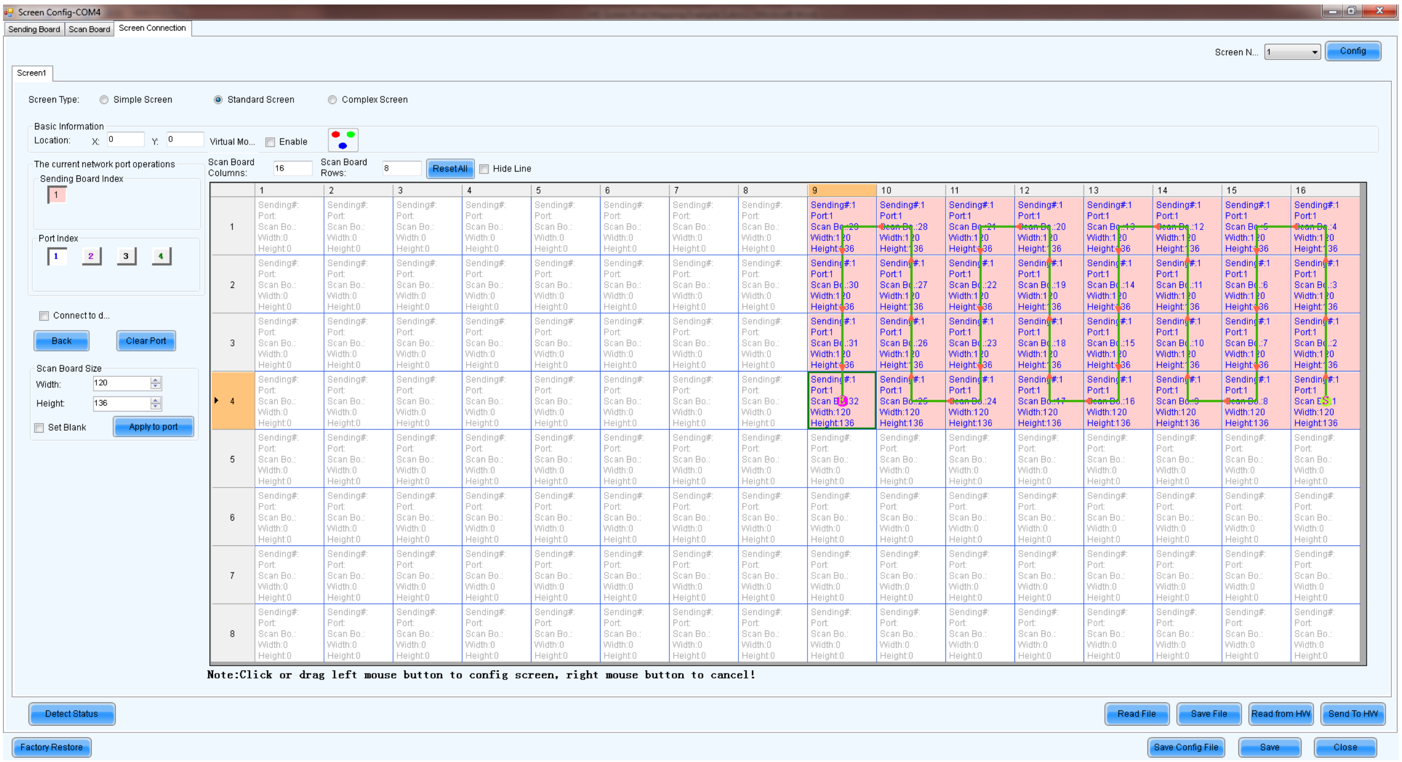

Figure 61 - Quadrant 1 fully clicked.

Now select the radio button for PORT INDEX 2.

Checking that the SCAN BOARD SIZE is still set to 120 x 135 click on the panel located at 8,4.

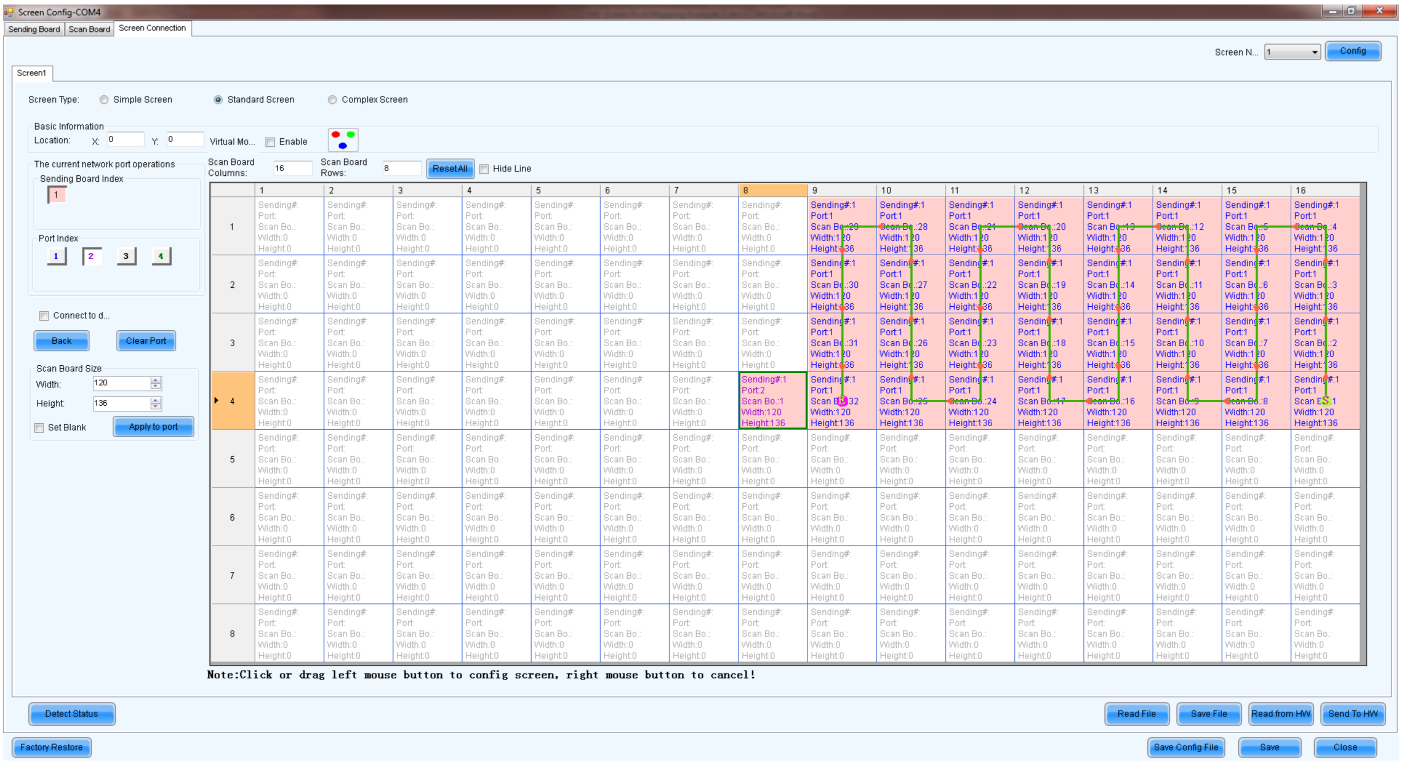

Figure 62 - Panel 8,4 clicked with Port Index 2 selected.

Now click through the second quadrant of the screen in the same direction that the Cat5 cable is connected in the real world.

Please note the yellow cable colour on the grid indicating that this quadrant is being fed from a different Port.

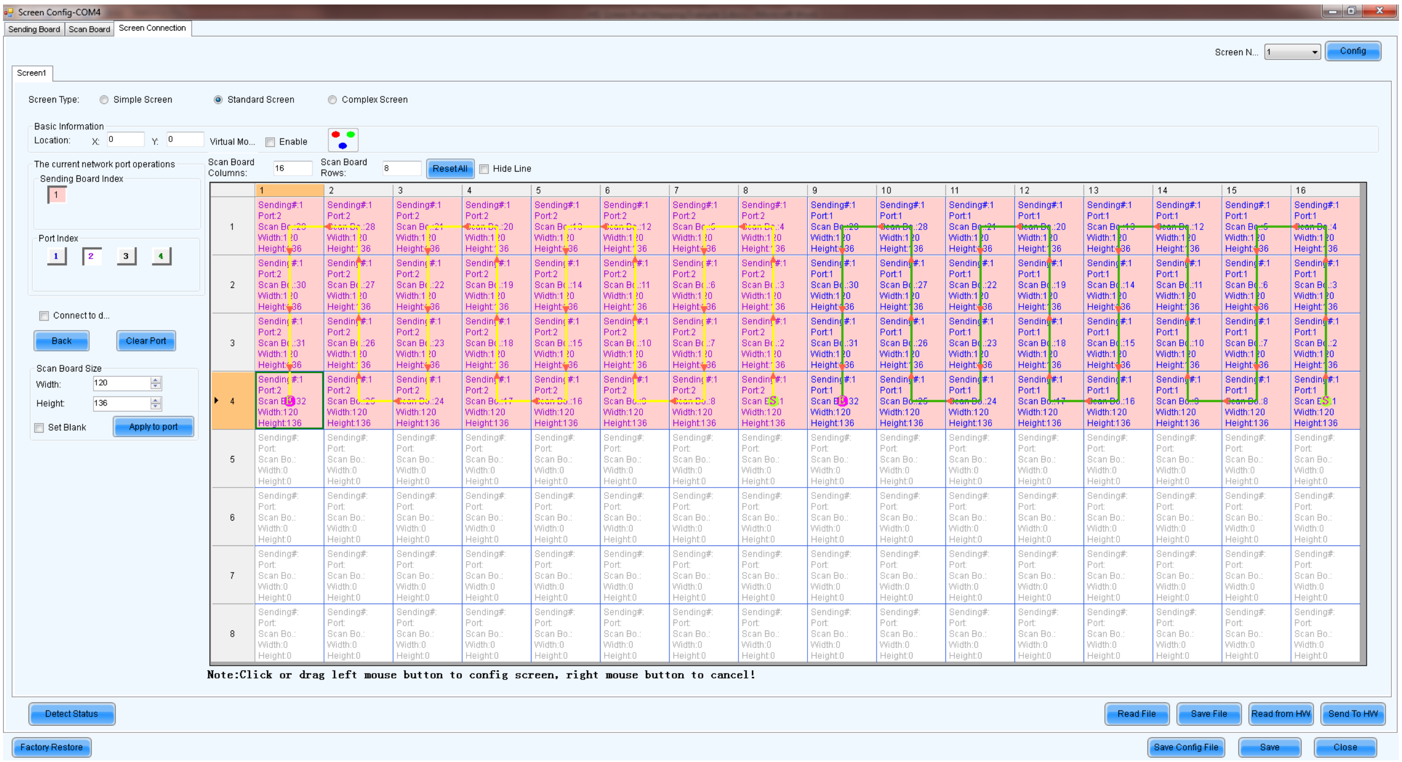

Figure 63 - Quadrant 2 fully clicked.

Repeat the process once more with Port 3 and Port 4 until the grid is fully clicked as appears as below:

Again, note how a different colour cable denotes each Port of the Navigator-NV.

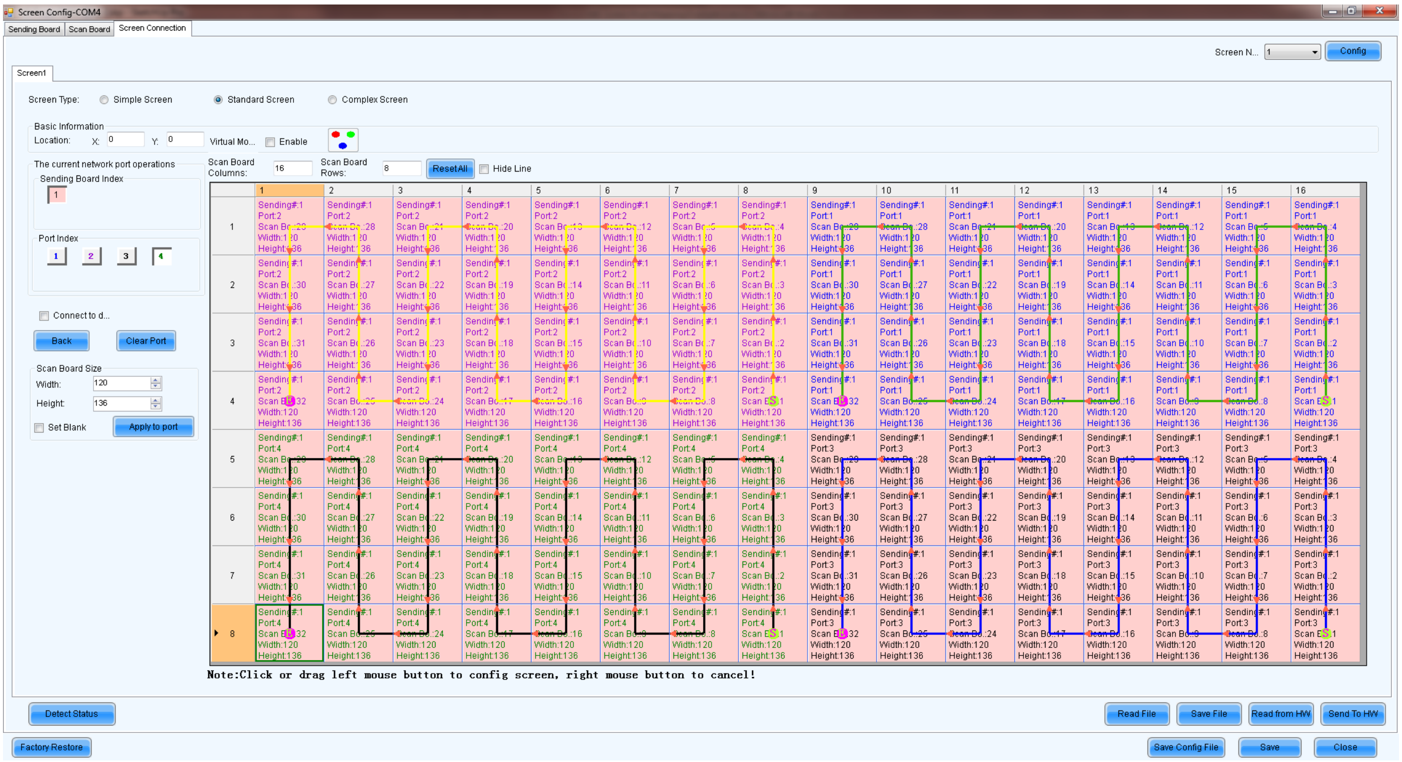

Figure 64 - Complete Grid, fully connected to Ports 1,2,3 & 4

All that now remains is to do a SEND TO HW and a SAVE operation.

Providing that your EDID and DVI source are correct and that the cable map has been programmed in exactly the same way as the real-world Cat5e connections, the pixel mapping should be executed correctly and instantly.

X, Y Image Offset with HD Programming

Please note, in the above example, the LOCATION X,Y setting on the SCREEN CONNECTION tab cannot be used with a 1920 x 1080 DVI source.

This is due to the fact that the LED screen has precisely 1920 x 1080 LED pixels.

If an image offset of even 1 pixel was selected, this would shift the entire LED image resulting in either the bottom or the right edge of the LED screen "falling off" the area of valid video image - a situation that Nova Mars will not allow.

The rule should be thought of as:

"Image Offset can only be used when DVI pixels is greater than LED pixels"

As an example, if the EDID and DVI input signal had been set to 1920 x 1200, the height of the signal is 1200 - 1080 = 120 pixels greater than the LED screen vertical pixel count.

What this translates to in Nova Mars is that LOCATION X,Y could have a Y value of anything up to 120 programmed in to generate a vertical image offset.

The moment however a Y value of 121 or more is used, Nova Mars will flag this up and disable the SEND and SAVE process sue to illegal values being used.

Even in this example, the only acceptable X value is zero since there are no spare pixel to shift in the X direction.

HD Screen Pixel Mapping Example 2

As in the previous example a 16 x 8 Toura 6 screen is to be pixel mapped enabling a full HD surface of LED screen to be displayed.

This time however the screen is cabled in horizontal strips and not quadrants.

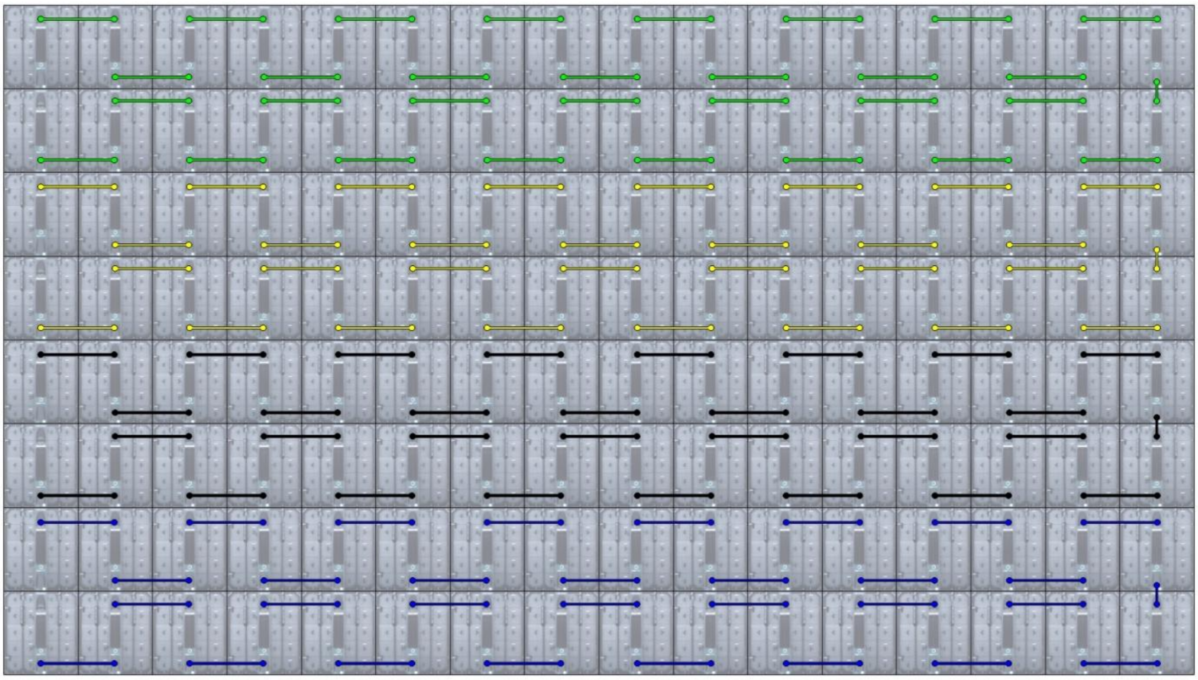

Figure 65 - 16 x 8 Toura 6 Screen Cabled in Quadrants

In the example, for illustration purposes the 4 Cat5 zones are coloured Green, Yellow, Blue and Black.

By cabling this way, each Port / Cat5 cable is responsible for 16 x 2 panels of LED screen.

The total pixel count on each cable is therefore

$$16 * 2 * 120 * 135 = 518400\ Pixels$$

Since 518400 is less than 655360, this cable method is compliant with the capacity limitations on Ports and Cables.

The 4 strips of Toura6 can then be connected to the Navigator-NV in two ways[7], both of which offer perfectly acceptable cable map options.

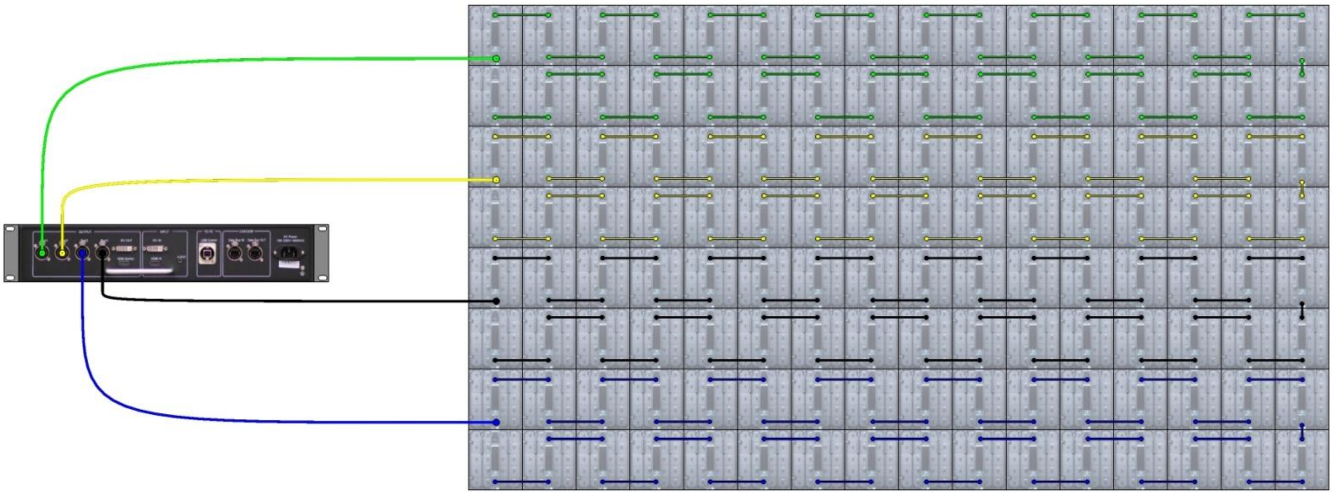

Figure 66 - Navigator-NV Connected in a Top to Bottom Data Flow

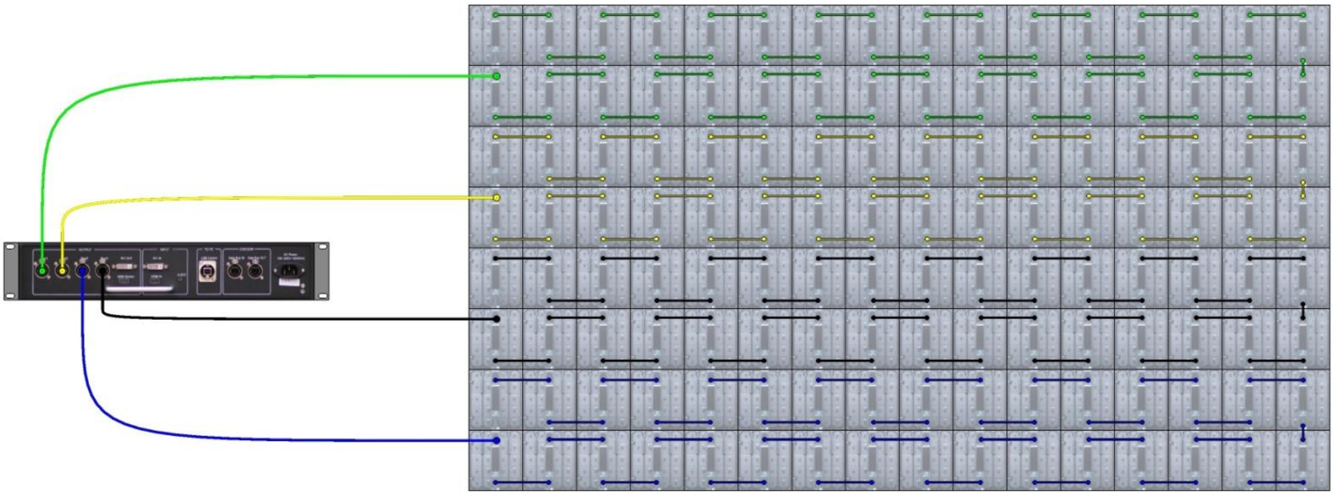

Figure 67 - Navigator-NV Connected in a Bottom to Top Data Flow

Please note - for the remainder of this example, the *Top to Bottom Diagram* will be used.

HD Programming Prerequisites

Given that the Toura6 screen in this example has an LED pixel resolution of 1920 x 1080 it is essential that the EDID settings of Nova Mars are also set to 1920 x 1080 or greater.

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[7] in truth, many different ways exist. For this example however, 2 are shown.

In addition, if the DVI signal is being supplied by an Image Pro or similar, it is also essential that the Image Pro is outputting 1920 x 1080 or greater.

While this may sound obvious, it is worth remembering that inside a Navigator-NV there is no scaling capability.

Without scaling, if your DVI source does not have enough pixels, your LED screen image will also not have enough pixels.

Remember : Once your EDID settings have been changed in the SENDER tab, please click SET and SAVE.

HD Programming

Enter the SCREEN CONFIG section of Nova Mars and click on the third tab labelled SCREEN CONNECTION.

With the example screen having 16 x 8 panels, enter values of 16 and 8 in the SCAN BOARD COLUMNS, SCAN BOARD ROWS boxes.

Now click RESET ALL to ensure the design grid is cleared of any previous programming.

The example screen is built with digiLED Toura6 LED panels which have a pixel resolution of 120 x 135.

Consequently, enter values of 120 , 135 into the SCAN BOARD SIZE box at the lower left of the SCREEN CONNECTION window.

Above this, click the button for PORT 1 and then click APPLY TO PORT.

It may also be helpful at this time to maximise the SCREEN CONNECTION window so that the entire grid of panels can be seen.

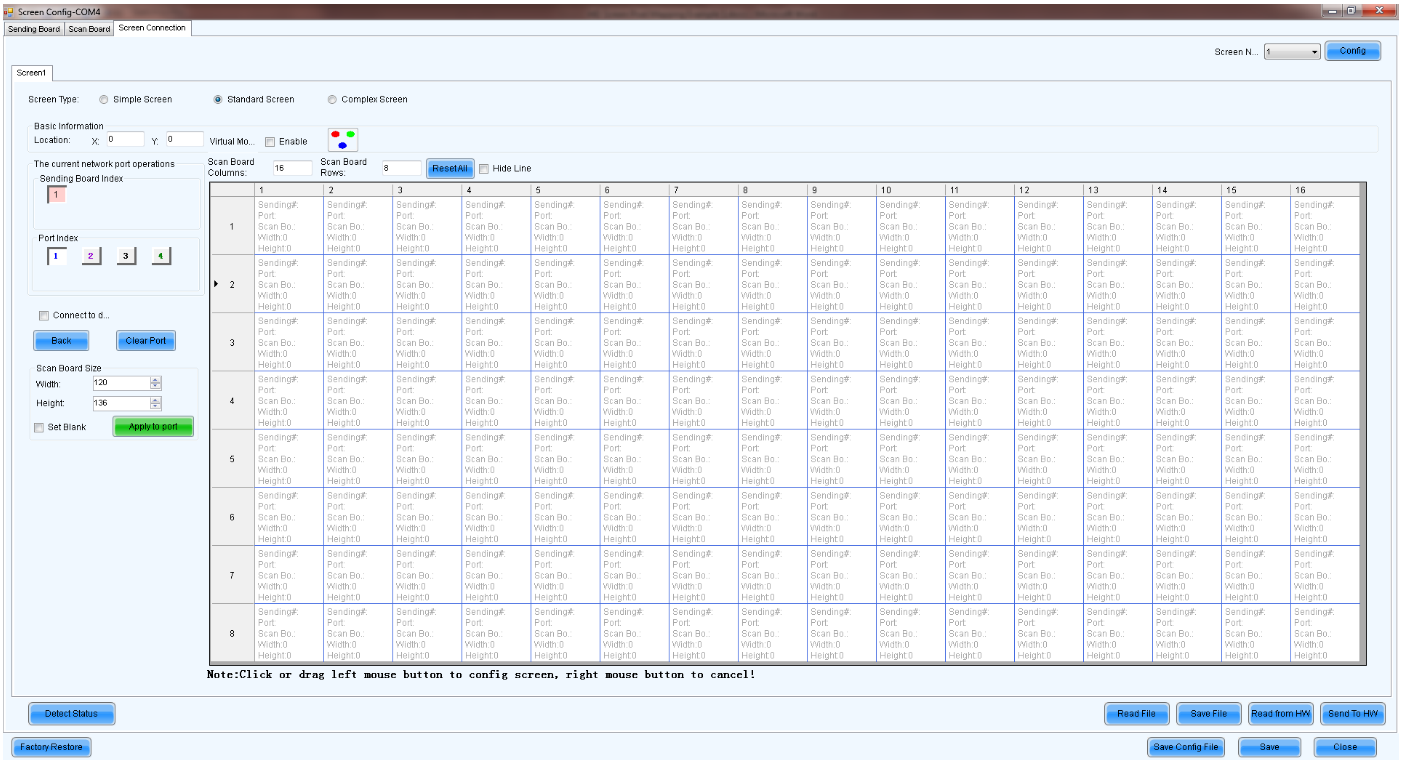

Figure 68 - Empty 16 x 8 grid of panels

Caution - The diagrams drawn above illustrate the back of the Toura6 screen. Programming operations take place from the front view ! Due to this, the panel at coordinate 16,1 is the first to be programmed.

Checking that PORT INDEX 1 is highlighted and that the SCAN BOARD SIZE is set to 120,135, click on the panel at location 16,1.

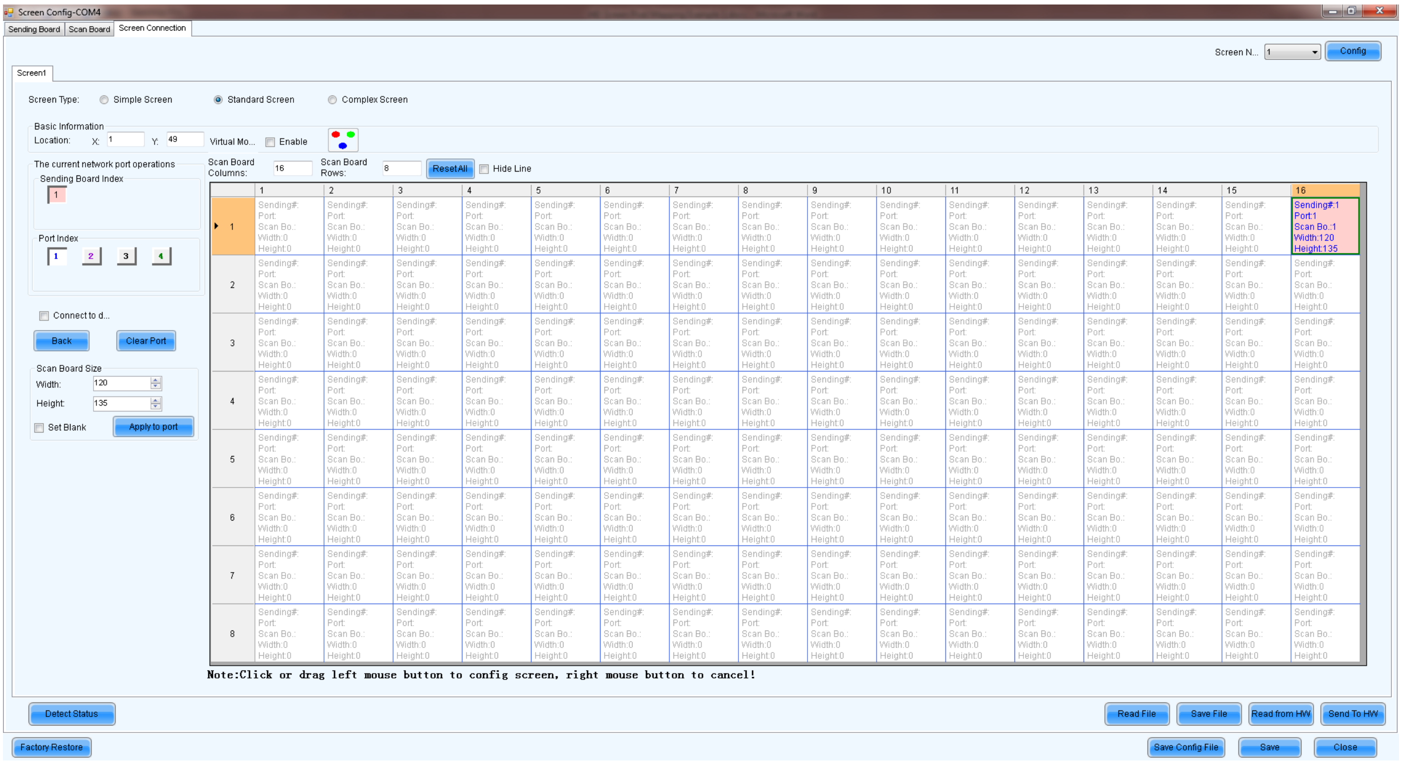

Figure 69 - Panel 16,4 selected as the first panel of Port1

Now click-through the remaining panels within that strip of the screen until the entire zone has been connected.

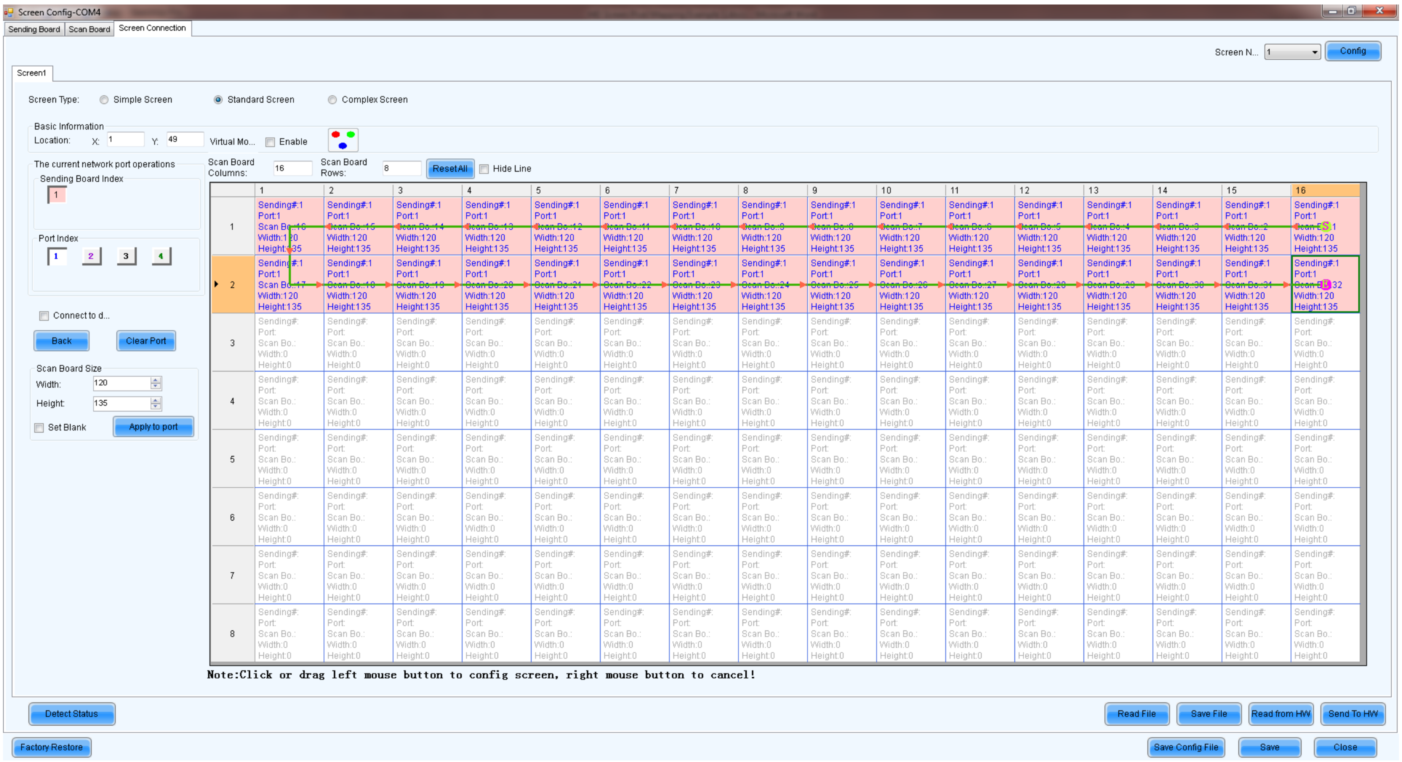

Figure 70 - Quadrant 1 fully clicked.

Now select the radio button for PORT INDEX 2.

Checking that the SCAN BOARD SIZE is still set to 120 x 135 click on the panel located at 16,3.

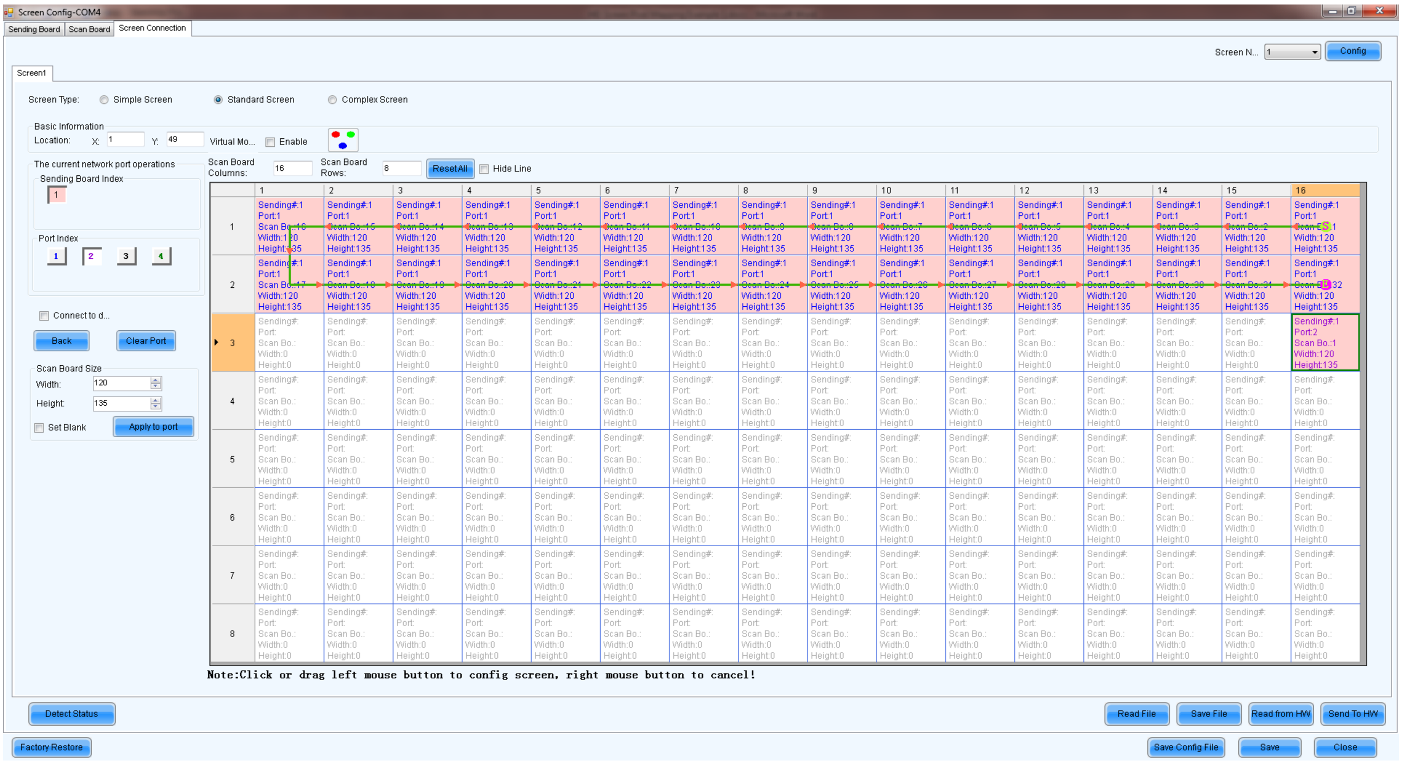

Figure 71 - Panel 8,4 clicked with Port Index 2 selected.

Now click through the second strip of the screen in the same direction that the Cat5 cable is connected in the real world.

Please note the yellow cable colour on the grid indicating that this quadrant is being fed from a different Port.

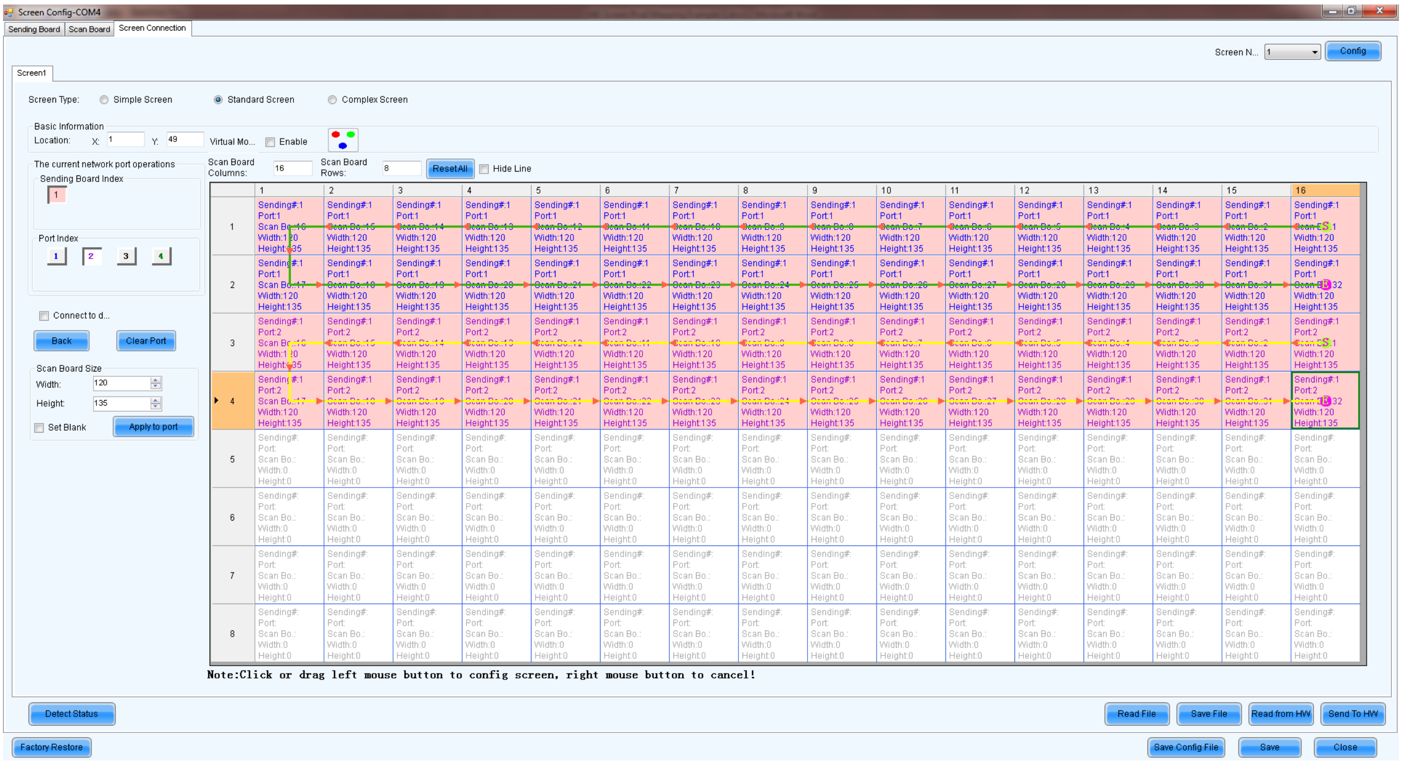

Figure 72 - Quadrant 2 fully clicked.

Repeat the process once more with Port 3 and Port 4 until the grid is fully clicked as appears as below:

Again, note how a different colour cable denotes each Port of the Navigator-NV.

Figure 73 - Complete Grid, fully connected to Ports 1,2,3 & 4

All that now remains is to do a SEND TO HW and a SAVE operation.

Providing that your EDID and DVI source are correct and that the cable map has been programmed in exactly the same way as the real-world Cat5e connections, the pixel mapping should be executed correctly and instantly.

X, Y Image Offset with HD Programming

Please note, as in the previous example, if the DVI video source is set to 1920 x 1080, the image offset cannot be used.

Notes on Example 2

Example 2 illustrated how an HD area of LED pixels can be quartered as horizontal stripes and not just quadrants as in Example 1.

In addition, it should be noted that Port4 of the Navigator-NV is not used to feed the bottom stripe of LED screen but the lower middle instead.

This is true of all Port allocation when programming. So long as the Port is not being asked to exceed 655360 pixels, the Ports active area of LED video can sit anywhere within the video canvas.

HD Screen Pixel Mapping Example 3

In this example a 10 x 6 iMAG 2600 screen is to be pixel mapped.

One of the first things to note is that while 10 panels of iMAG 2600 gives a pixel width of 1920, 6 panels high does NOT equal 1080!

This is typical of the design decisions that have to be made when matching real-world LED screen builds to clients expectations. Native 1920 x 1080 is simply not possible with iMAG 2600. The two choices available are 1920 x 960 (5 rows of panels) or 1920 x 1152 (if 6 rows of panels are used)

For this example however we will proceed with a 10 x 6 panel screen as illustrated below:

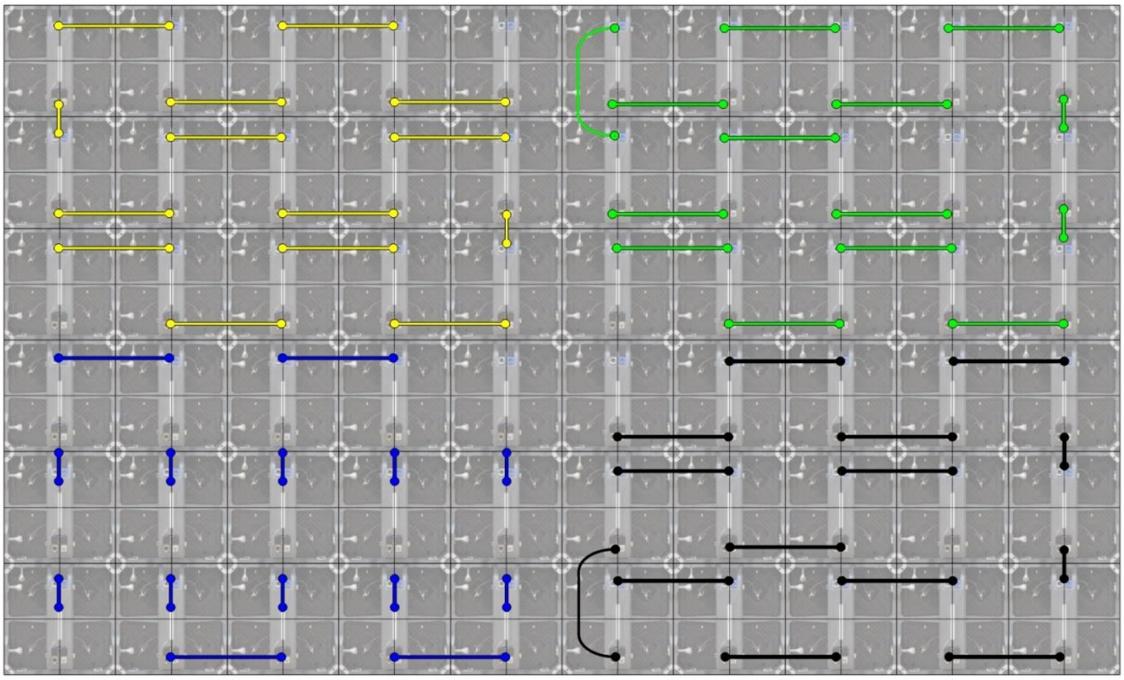

Figure 74 - 10 x 6 iMAG Screen Cabled in Quadrants

In the example, for illustration purposes the 4 Cat5 zones are coloured Green, Yellow, Blue and Black.

As before, cabling this way, each Port / Cat5 cable is responsible for 5 x 3 panels of LED screen.

The total pixel count on each cable is therefore

$$5 * 3 * 192 * 192 \ = \ 552960 \ Pixels$$

Since 552960 is less than 655360, this cable method is compliant with the capacity limitations on Ports and Cables.

You may notice however from the diagram that the techs undertaking the cabling were smoking whacky backy when they cabled the screen - each quadrant is cabled in a totally different manner.

To make matter worse, the quadrants have then been plugged into the Navigator-NV in the following fashion:

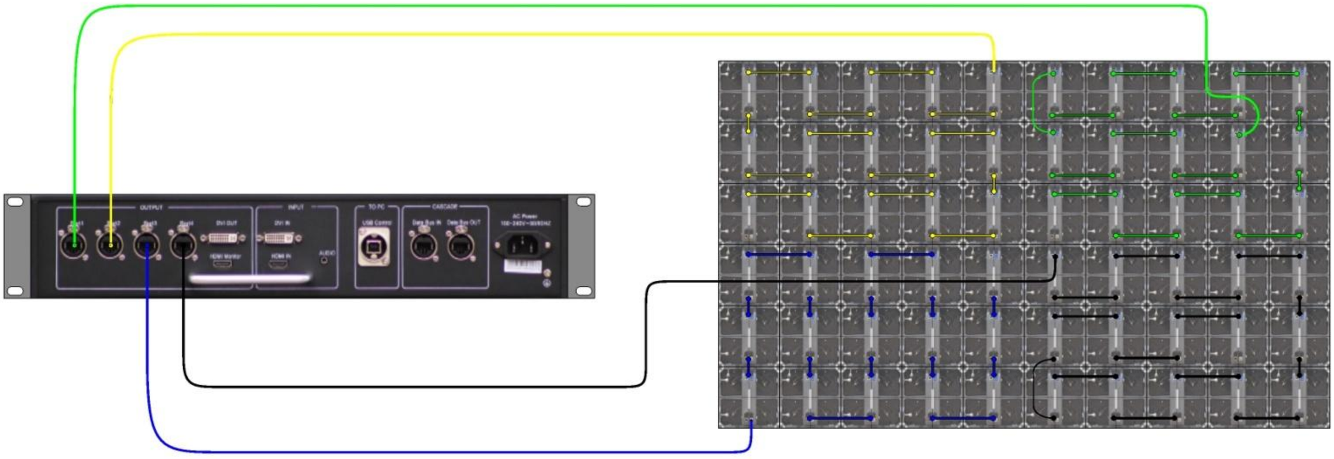

Figure 75 - 4 Port Navigator-NV Connection to iMAG Quadrants

Don't Worry ! Providing that the cable map is carefully entered into Nova Mars this is still a perfectly valid way of cabling a screen.

EDID Settings for 10 x 6 iMAG

As noted above, a 10 x 6 iMAG screen does not equal HD in the truest sense of the word. Instead, it has 1920 x 1152 Pixels.

In cases such as this, digiLED strongly advises that a custom EDID is NOT used.

Instead, the nearest standard EDID should be selected that is the same or slightly larger than the pixel count of the LED screen.

In this example use a value of 1920 x 1200.

As before, complete the EDID selection using as SET and SAVE.

HD Programming

Enter the SCREEN CONFIG section of Nova Mars and click on the third tab labelled SCREEN CONNECTION.

With the example screen having 10 x 6 panels, enter values of 10 and 6 in the SCAN BOARD COLUMNS, SCAN BOARD ROWS boxes.

Now click RESET ALL to ensure the design grid is cleared of any previous programming.

The example screen is built with digiLED iMAG 2600 LED panels which have a pixel resolution of 192 x 192.

Consequently, enter values of 192 , 192 into the SCAN BOARD SIZE box at the lower left of the SCREEN CONNECTION window.

Above this, click the button for PORT 1 and then click APPLY TO PORT.

It may also be helpful at this time to maximise the SCREEN CONNECTION window so that the entire grid of panels can be seen.

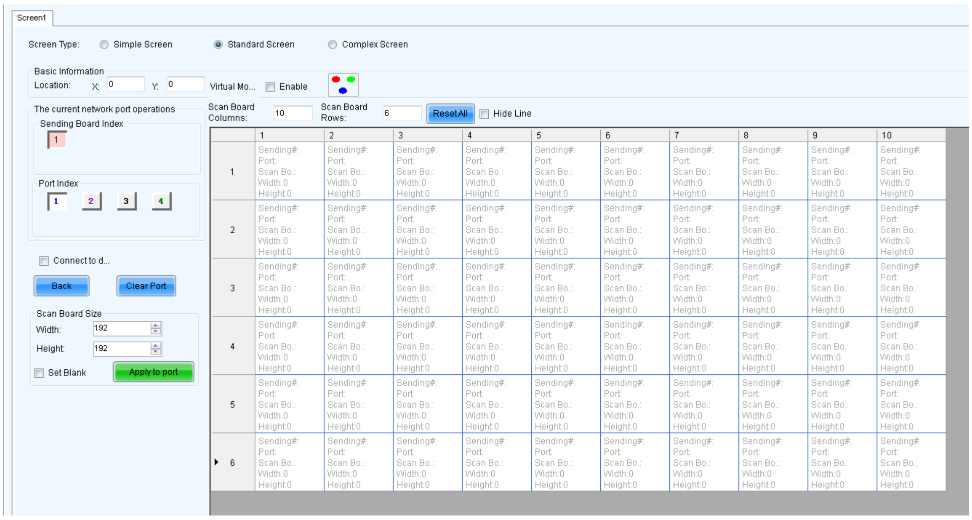

Figure 76 - Empty 10 x 6 grid of panels

Caution - The Navigator-NV and LED panels previously illustrated show the back of the iMAG 2600 screen. Programming operations take place from the front view !

Since the crazy techs plugged Port 1 of the Navigator-NV into a slightly illogical place on the screen, double check where this connection is made... in this example, the panel at coordinate 2,2.

Checking that PORT INDEX 1 is highlighted and that the SCAN BOARD SIZE is set to 192,192 click on the panel at location 2,2.

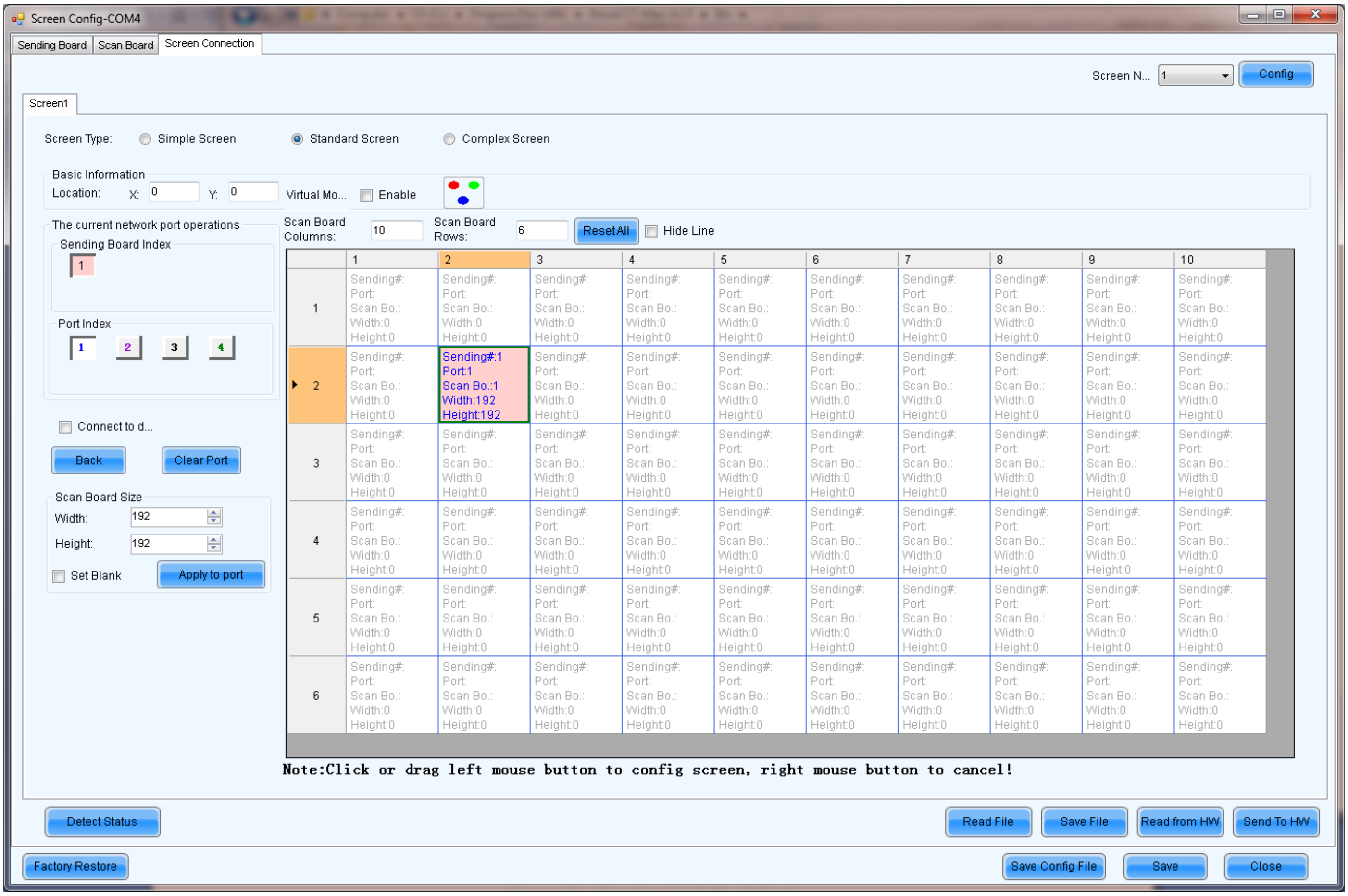

Figure 77 - Panel 16,4 selected as the first panel of Port1

Now click-through the remaining panels within that quadrant of the screen taking particular care to follow the front view of the cable map that the crazy techs have plugged up until the entire zone has been connected.

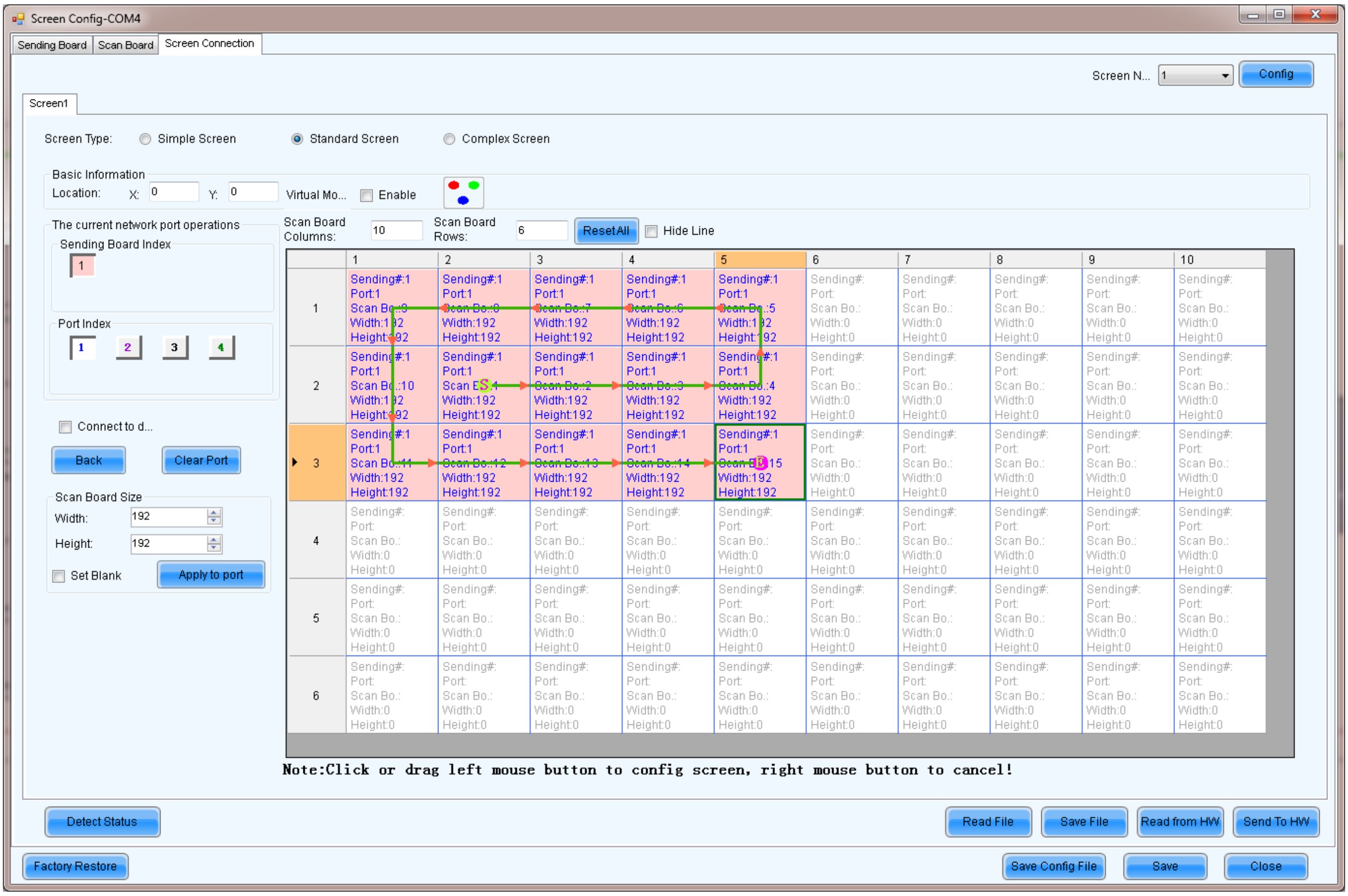

Figure 78 - Quadrant 1 fully clicked.

Now select the radio button for PORT INDEX 2.

Checking that the SCAN BOARD SIZE is still set to 192 x 192 click on the panel located at 5,1 .

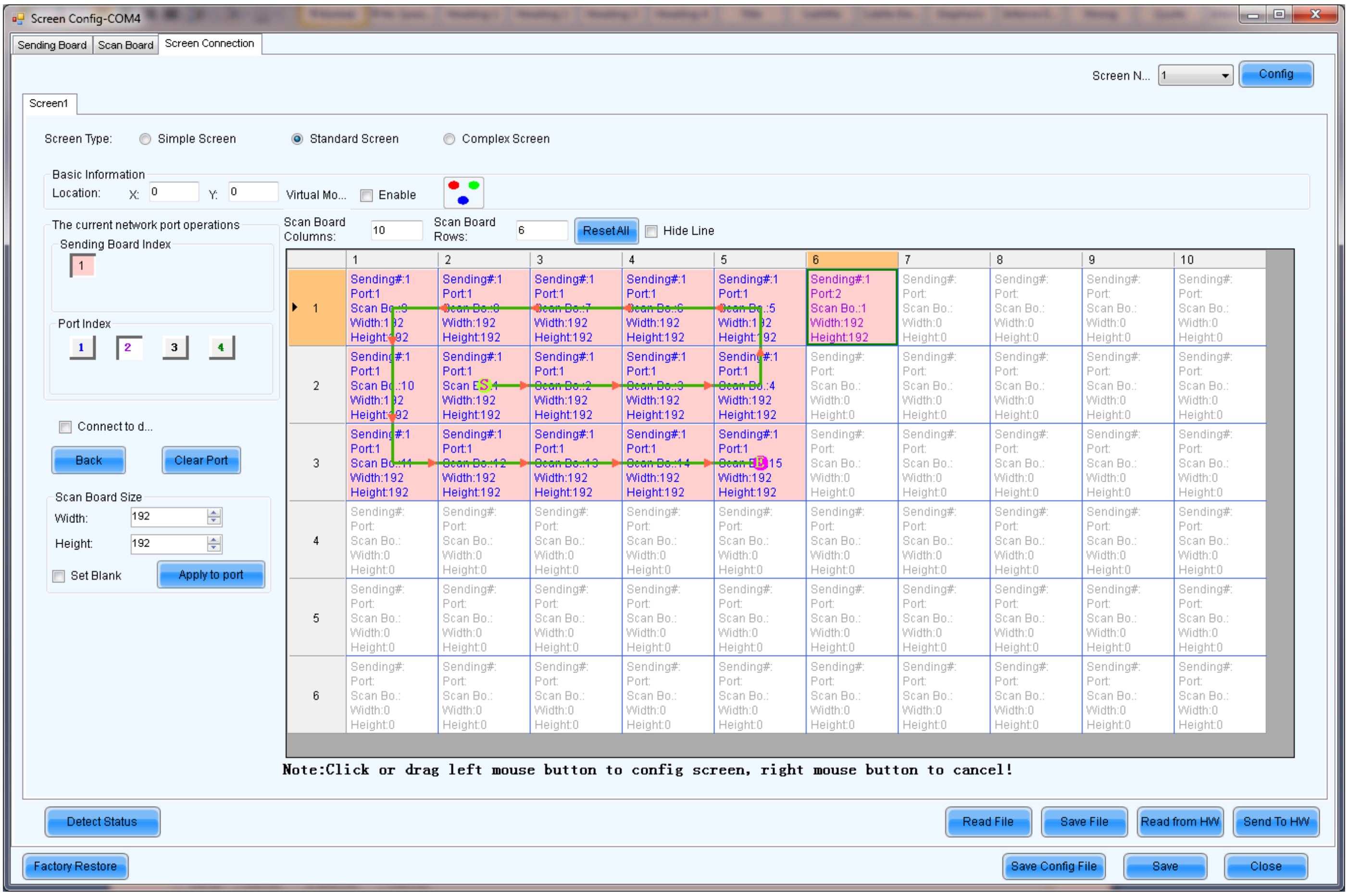

Figure 79 - Panel 8,4 clicked with Port Index 2 selected.

Now click through the second quadrant of the screen in the same direction that the crazy Cat5 cable is connected in the real world.

Please note the yellow cable colour on the grid indicating that this quadrant is being fed from a different Port.

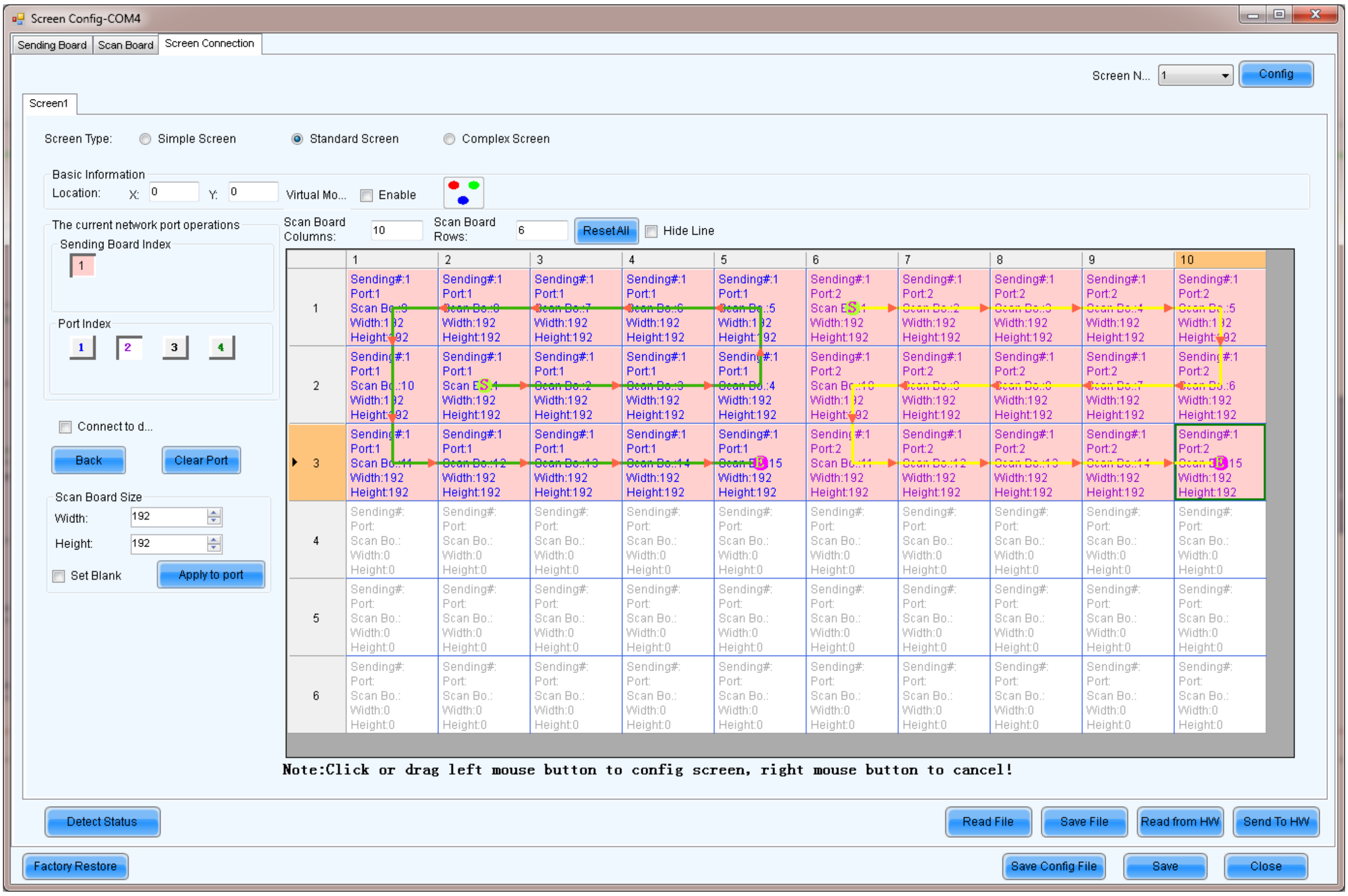

Figure 80 - Quadrant 2 fully clicked.

Repeat the process once more with Port 3 and Port 4 paying carefull attention to the bizarre and creative cable routes the screen techs have real-world plugged until the grid is fully clicked as shown as below:

Again, note how a different colour cable denotes each Port of the Navigator-NV.

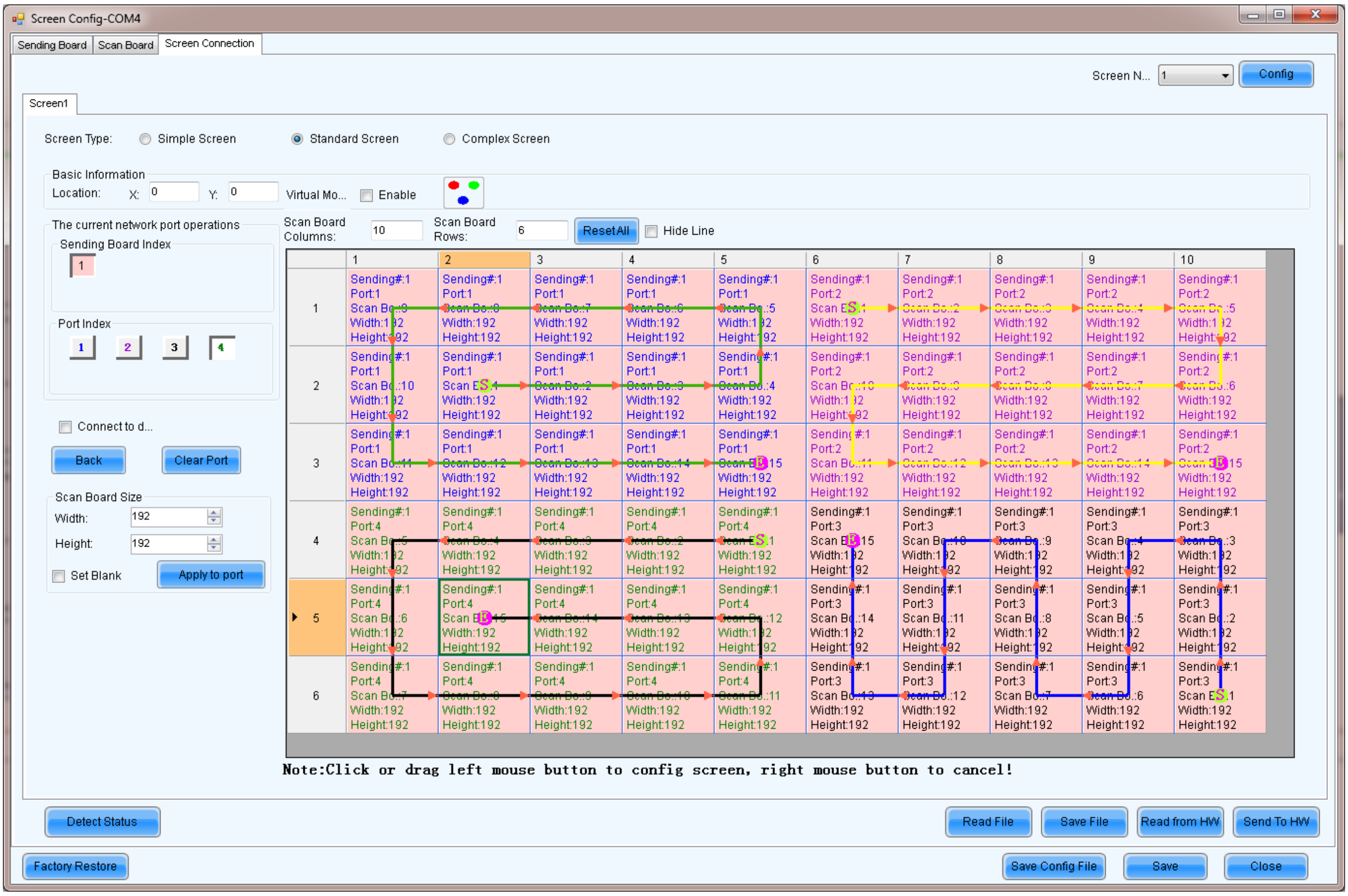

Figure 81 - Complete Grid, fully connected to Ports 1,2,3 & 4

All that now remains is to do a SEND TO HW and a SAVE operation.

Providing that your EDID and DVI source are correct and that the cable map has been programmed in exactly the same way as the real-world Cat5e connections, the pixel mapping should be executed correctly and instantly.

Notes on Example 3

The reason that 4 different quadrants with 4 different cable maps have been selected for this example is to show that the physical direction of the Cat5 cable has no effect on the video image.

So long as the real-world cable map has been accurately transposed into Nova Mars, the software is capable of accounting for any cable route that may be used.

X, Y Image Offset with Example 3

Because the LED screen in the example has a pixel resolution of 1920 x 1152 and the EDID selected has a resolution of 1920 x 1200, there is possible image offset in the Y direction only.

1200 - 1152 = 48 pixels of available Y offset can be chosen in this example to select which part of the DVI signal is displayed on the LED screen.

Any Y offset beyond 48 or any X offset greater than 0 would be invalid and Nova Mars will throw up errors at the moment of SEND and SAVE if these were chosen.

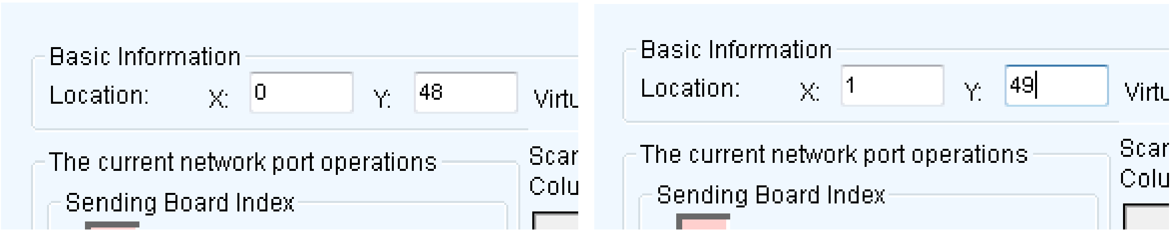

Figure 82 - OK vs NOT OK Settings for Image Offset

Beyond HD Screen Programming

Multi Screen Management

Hot Backup

A useful feature of Nova Mars is the ability to create a Hot Backup data connection from the Navigator-NV to the LED panels.

The advantage of this technique is that it effectively doubles the reliability of the data connection to the screen by backing-up the main Cat5e digiDATA with a second cable.

Within 2 mS of a fault being detected on the main digiDATA cable, the screen can be configured to swap over to the backup, normally happening without the viewing audience even noticing.

Hot Backup Principal

Normally, when cabling an LED screen, a daisy-chain of panels is connected together with Cat5e cable. The first panel in the daisy-chain is connected to the Navigator-NV while the last panel normally has a blank data OUT with nothing connected.

Hot Backup works by taking the otherwise unused Cat5 data out of the very last LED panel in the screen and returning the signal to a second port on the Navigator-NV with a long Cat5e cable as shown below:

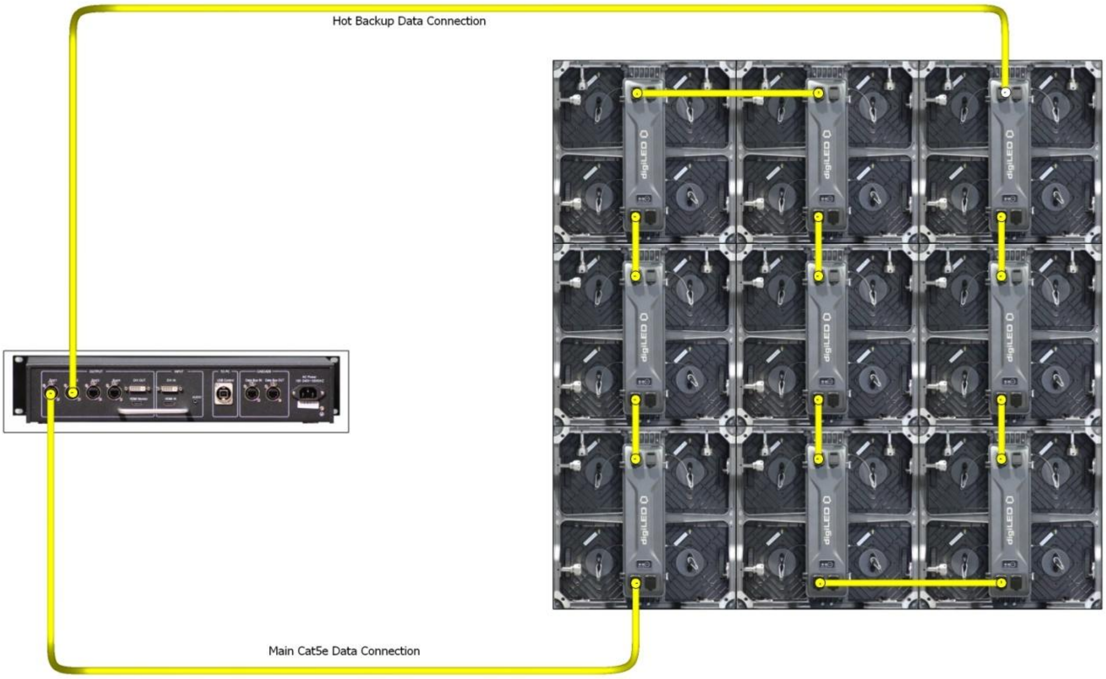

Figure 83 - Hot Backup Data Connection

In normal operation (once configured), this second cable does nothing.

If however a fault develops in the screen and one or more panels detect a loss of signal, the Scancards inside will automatically swap over to the second (backup) cable.

The result is that despite a section of the screen suffering what would have been a catastrophic signal loss, the LED panels all continue to display a video image with minimal interruption[8] of the video seen by the audience.

Hot Backup Programming

The following example is used for illustrating the principals of Hot Backup Programming.

[8] The swap-over from main to backup signal takes approximately 0.06 seconds.

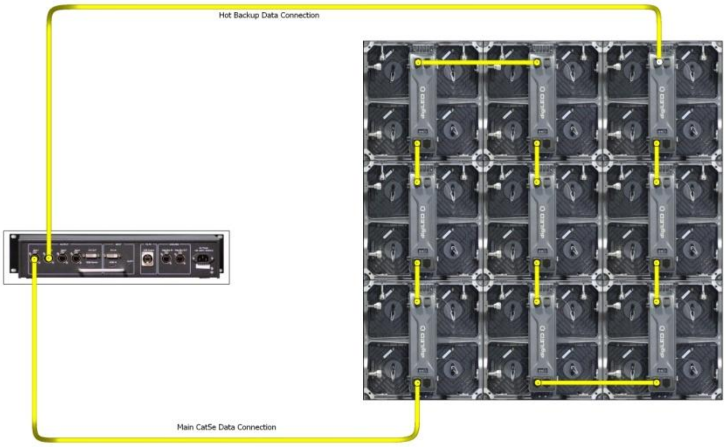

Figure 84 - Hot Backup Connection Example

In normal screen programming, setting the Hot Backup is one of the very last procedures to be completed. This example therefore assumes that a Screen Connection operation has been both SENT and SAVED as shown below:

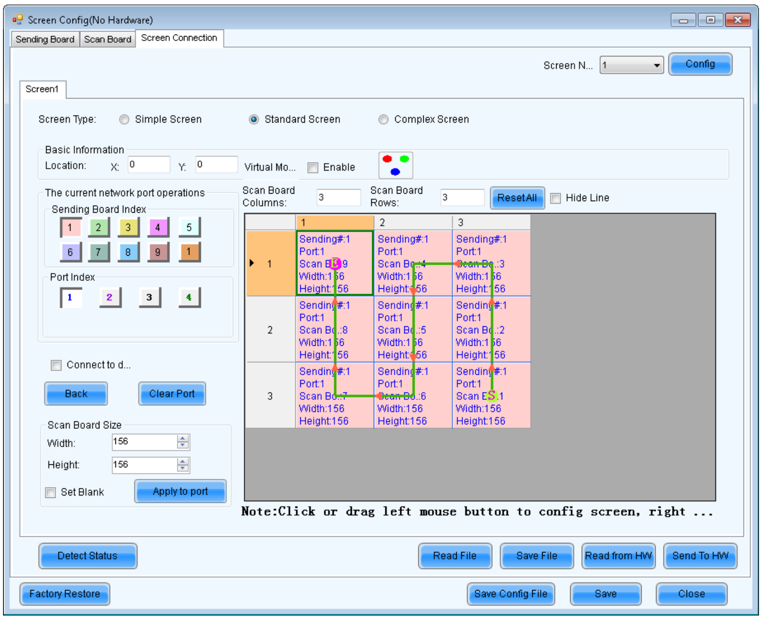

Figure 85 - a 3 x 3 Screen Connection Grid (SENT and SAVED)

To configure the Hot Backup, switch back to the first tab in the Screen Config set. (SENDING BOARD)

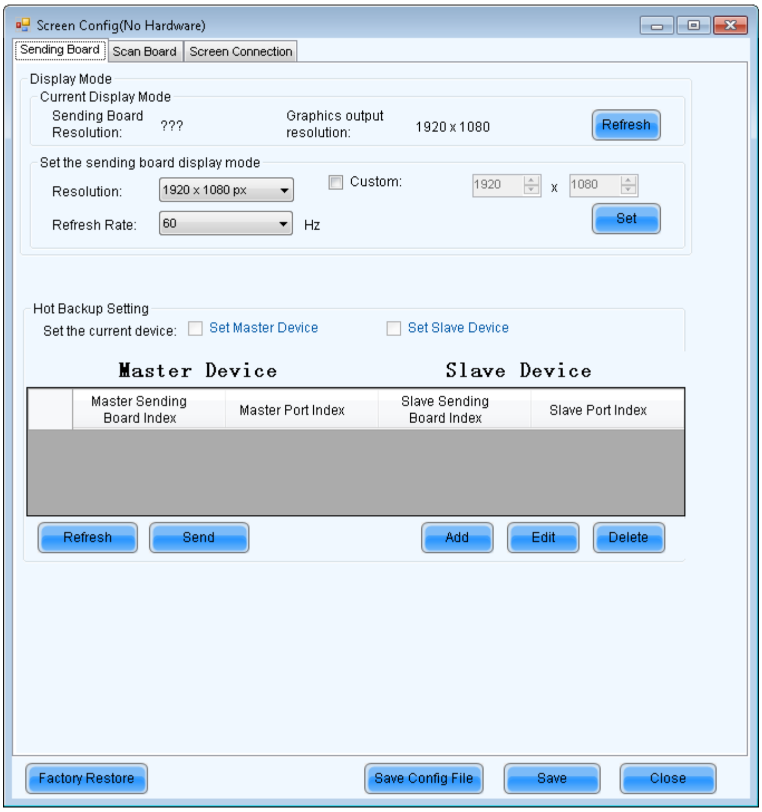

Figure 86 - the Sending Board Tab

In the centre section of this window, click the ADD button. The following window will be displayed:

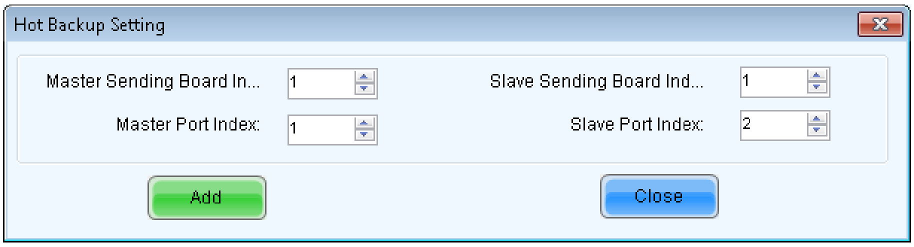

Figure 87 - Add Window for Hot Backup Settings

In this case, the default values that are offered (as shown above) are exactly what's needed for our example. The way to read the settings is:

Master Sending Board In...	The Navigator-NV which will be used as the Master TX signal in this configuration.
Master Port Index:	The Port on the above Navigator-NV which is to be used as the Master TX data port.
Slave Sending Board Ind...	The Navigator-NV which will be configured as the backup

	device (can be the same machine as the TX or a different machine connected on the data bus.
Slave Port Index:	The Port on the above Navigator-NV which will be used as the Hot Backup port.

Figure 88 - Hot Backup Settings - Description

Click ADD to add the values to the Sender Tab Hot Backup config.

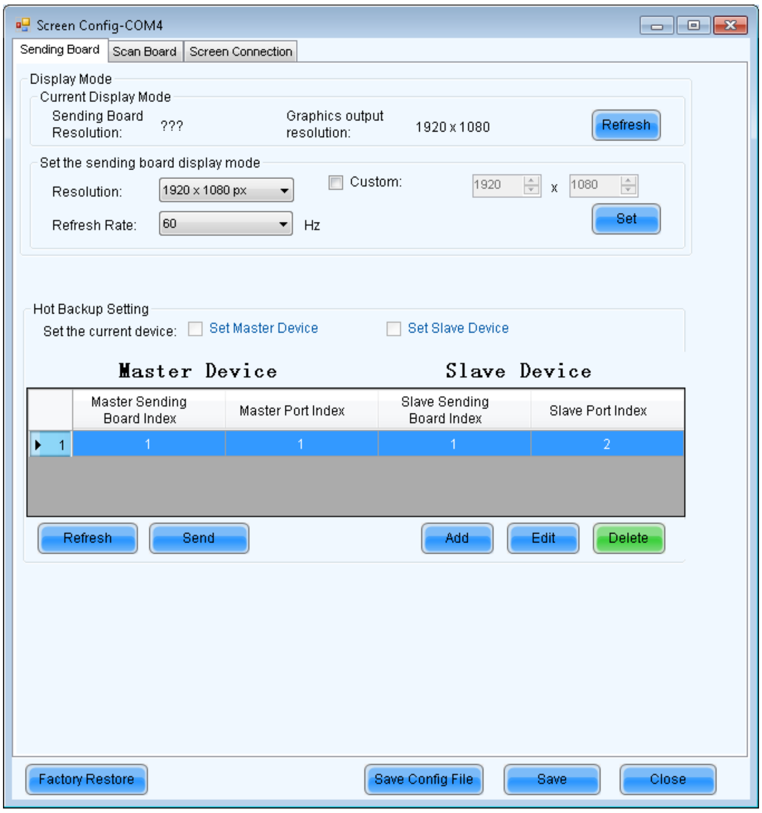

Figure 89 - Hot Backup Data added to Sender tab

Now click SEND to transmit the Hot Backup data to the Navigator-NV.

Finally, click SAVE at the bottom of the window to make the settings permanent[9]

Hot Backup (Medium Size Screens)

If your array of LED panels is large enough that two Cat5e feeds from two Navigator-NV Ports are needed, Hot Backups can still be created with the two remaining (unused) Ports.

[9] Permanent = will not be lost after power-down. Remains permanent until the next SAVE button click.

In the following example, the screen below is configured to have 2 x TX lines and 2 x Hot Backup lines:

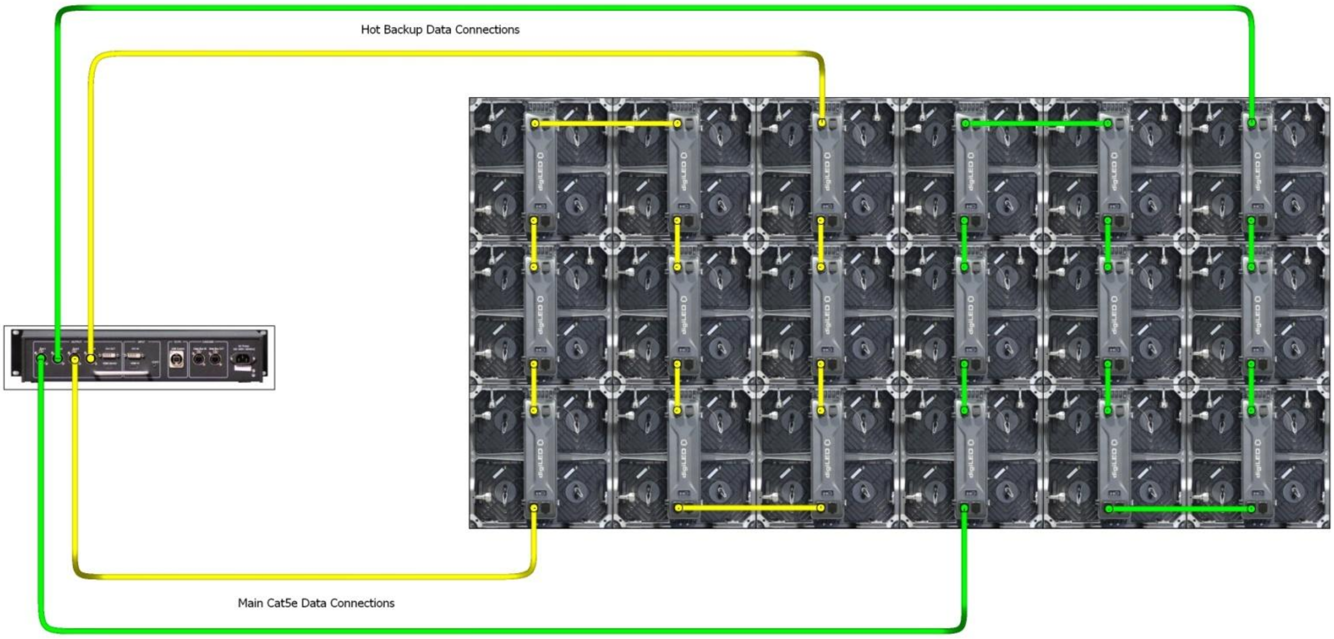

Figure 90 - Double Hot Backup on 1 Navigator-NV

To configure this Hot Backup system, 2 x ADD operations are needed (as per the example above)

The first ADD should have the parameters as shown below:

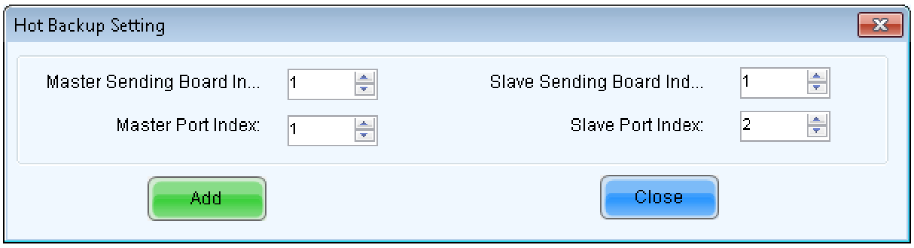

Figure 91 - ADD Hot Backup #1

The second ADD should have parameters as shown below:

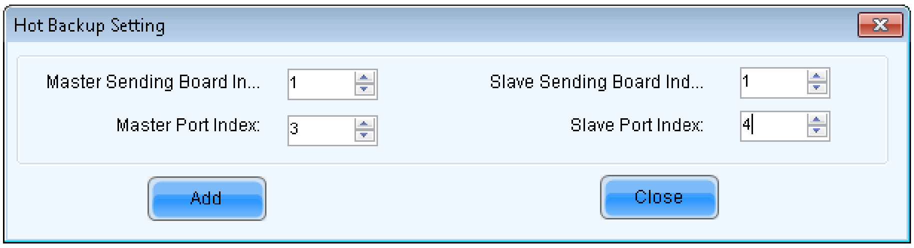

Figure 92 - ADD Hot Backup #2

In summary, what these 2 x ADD procedures are saying is:

"Port 1 should be backed up by Port 2 and Port 3 should be backed up by Port 4 - all on Navigator-NV #1"

As with previous examples, complete the programming operation by clicking both SEND and then SAVE.

Hot Backup (HD Screens)
In screen builds where

details on multiple Navigator hot backup to be inserted.

Auto Brightness Control (ABC)

Hardware

To enable Auto Brightness Control of a digiLED screen with Nova Mars the following equipment is needed:

- a digiLED Navigator-NV
- a Windows PC with Nova Mars installed and connected to the Navigator-NV
- a digiLED screen with at least 1 x Cat5e or Cat6 connection to the Navigator-NV
- an MCTRL 320 Function Box
- a 110 to 240 vac supply for the above box
- a weatherproof enclosure for the Function Box (if it is to be installed outdoors)
- an LM3200 weatherproof lux meter to plug into the Function Box
- A Cat6 interlink cable to add the Function Box into the Cat6 data circuit running the screen.

digiLED can supply all of the above components as required. Please speak to your digiLED sales channel for full supply details.

Connection

The principal for connecting an ABC is to place a MCTRL 320 function box on one of the ports of the Navigator-NV.

The port used can be a port that already supplies digiDATA to the LED or screen or it can be an unused port, not part of the Screen Connection.

The interconnection Cat5 / Cat6 should be standard wired IEEE Ethernet and not crossover cable.

A diagram showing the connection via a screen-used port is shown below:

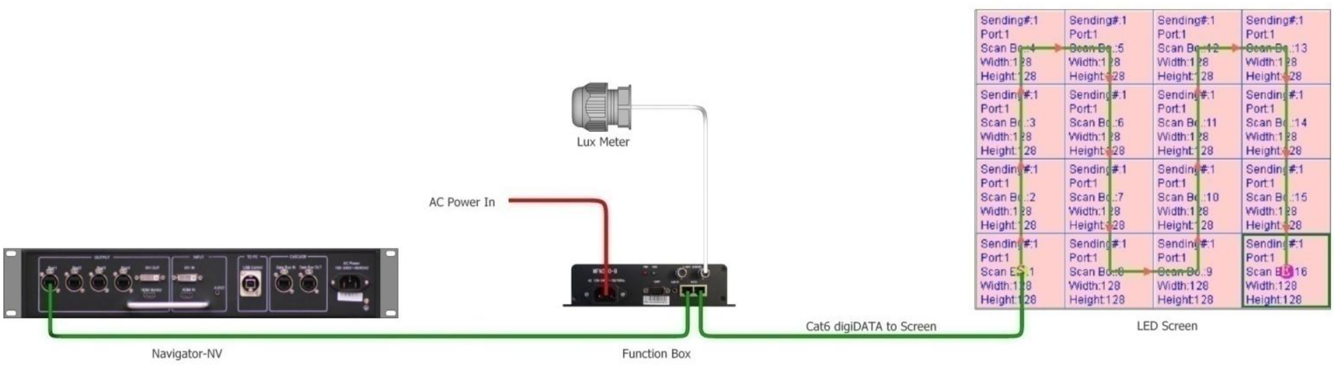

Figure 93 - Method A - ABC Connected to Screen and Navigator-NV

Alternatively, the system could be connected to an unused Port as below:

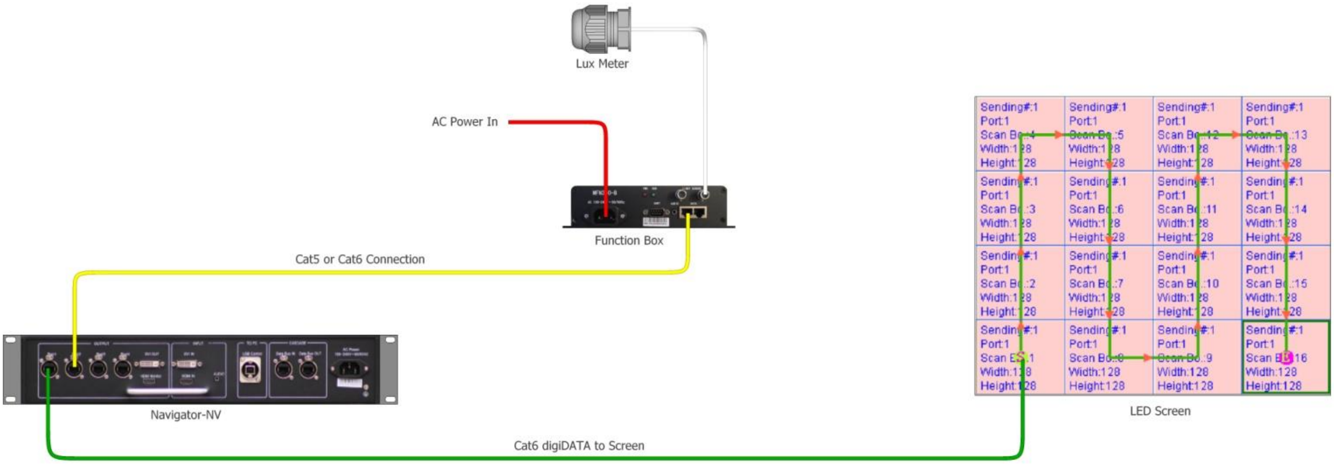

Figure 94 - - Method B - ABC (alternative connection method)

Setup

To setup a digiLED / Nova ABC, the following 4 stage process must be completed.

- Connect the hardware as required.
- Configure Nova Mars to talk to the Function Card.
- Configure the Light Sensor on the Function Card.
- Configure the Brightness Control to use data from the Function Card.

Assuming the connection of the hardware has been completed as per Method A or Method B detailed in the previous chapter, the function card must now be configured to tell Nova Mars how the system is setup.

From the top level menu of Nova Mars, click the icon for the function card.

The following window will be displayed:

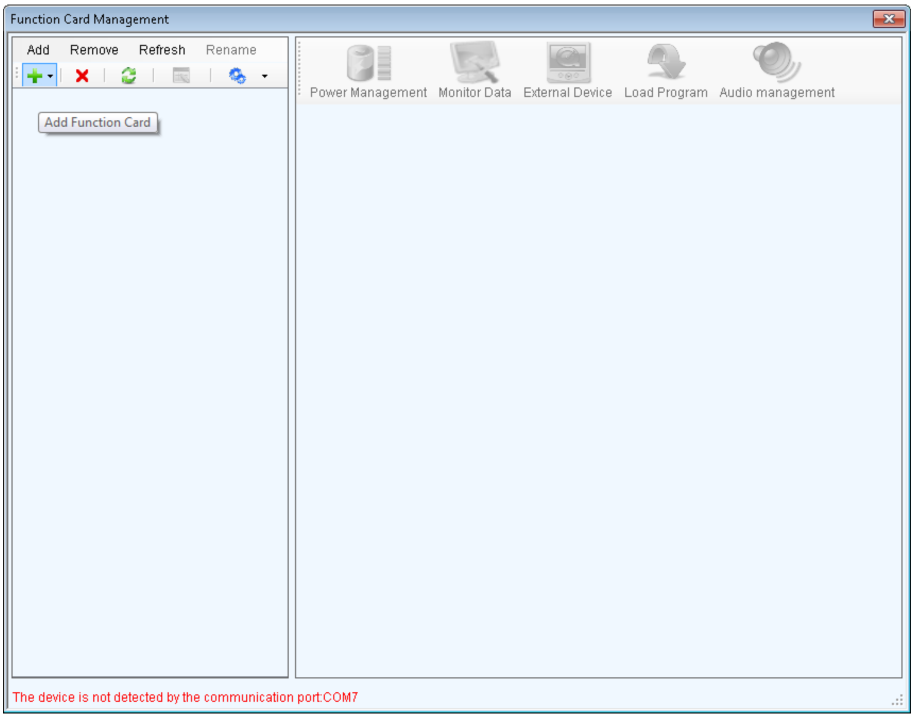

Figure 95 - The Function Card Window

If the Nova Mars installation is a virgin installation and has never before been used with an ABC, the window will display as above.

If instead, there is a memory of the last ABC that was setup, a tree structure may be shown as below:

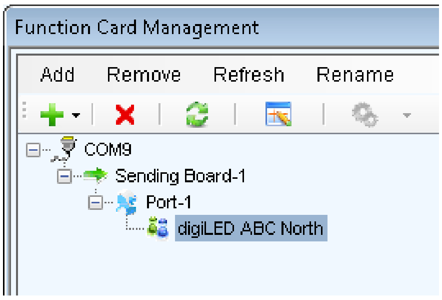

Figure 96 - Previously set ABC parameters

If you see a previously set ABC in the Function Card window it is best to delete this configuration to ensure the new setup is correctly installed.

Delete the previous configuration with the red X icon.

A confirmation window will pop up asking "Are you sure ? "

Confirm the action by clicking YES.

The Function Card Window is now blank and ready for a new ABC setup.

Adding the Light Sensor

Click the green + icon to add a new Light Sensor the Function Card.

Select ETHERNET PORT[10] from the dropdown menu.

The following window will appear:

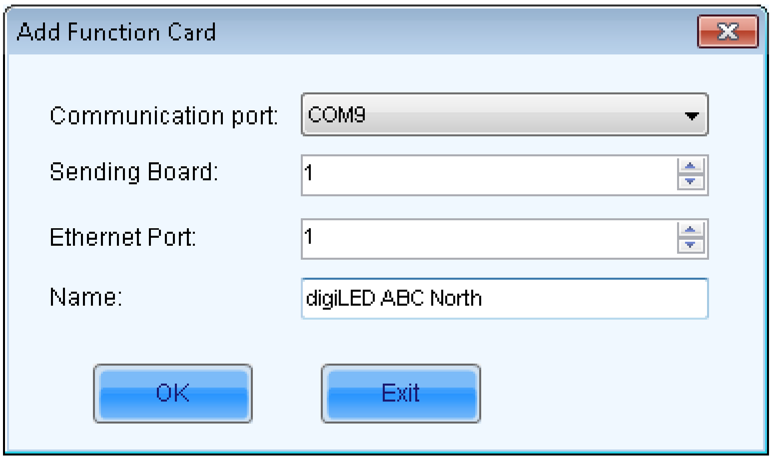

Figure 97 - Add Light Sensor Window

The default Communication Port will be suggested if only one Navigator-NV is connected (Com9 in the above example)

In systems with only a single Navigator-NV, SENDING BOARD will always be set to 1 as above.[11]

For the Ethernet Port, select the Port on the Navigator-NV that has the Function Card connected. i.e.   1 in the example below:

[10] While the phrase "Ethernet Port" is used, this is just a description. No actual Ethernet protocol is used in the ABC comms setup

[11] Multiple Navigator-NV setups that use the data buss connection on the rear of the Navigator-NV can have the function card & ABC connected to any Navigator-NV in the system.

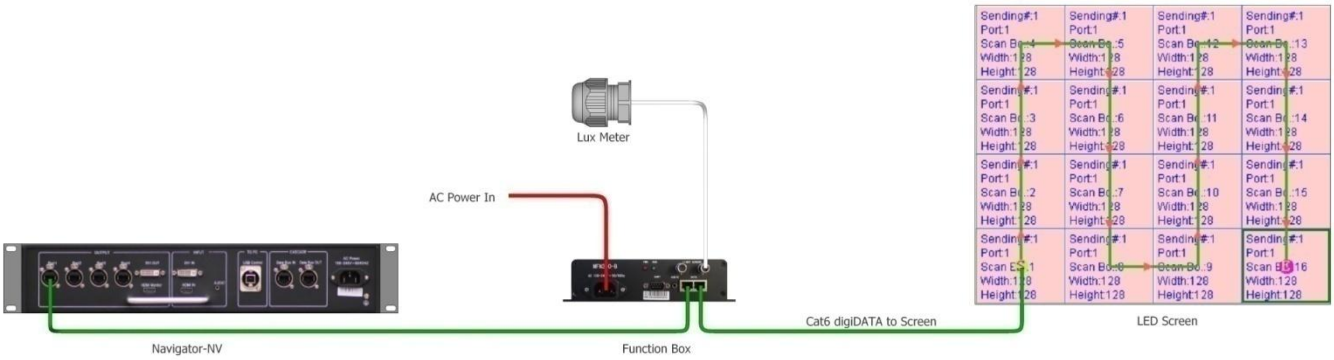

Figure 98 - Function Card connected to Port 1

...or 2 in the example below:

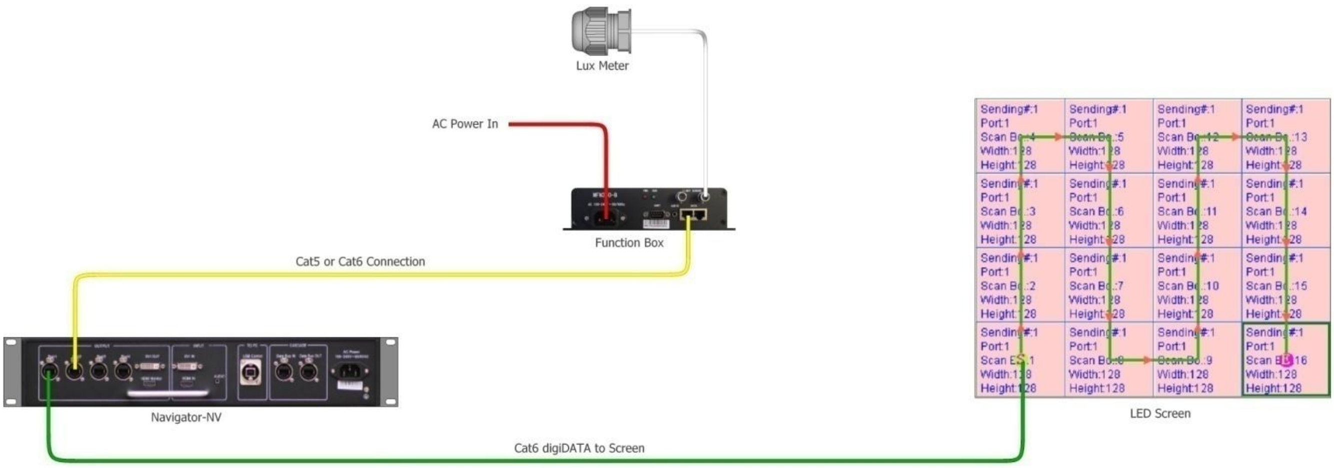

Figure 99 - Function Card connected to Port 2

Finally, to complete the ADD process for the Function Card, give the card a name in the lower box.

digiLED suggests a naming convention based on geographical position or Light Sensor direction. i.e. "Leicester Square North"[12]

Click OK to finalise the process.

[12] This becomes particularly relevant when multiple Light Sensors are configured on one system.

The Function Card will now display a connection tree for the ABC in the left hand pane.

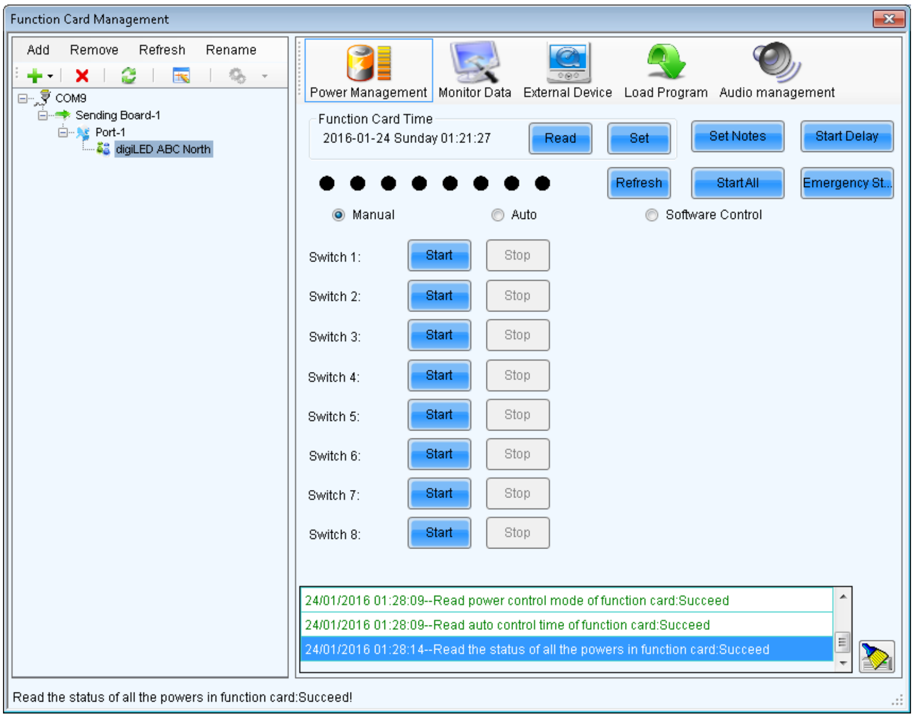

Figure 100 - Function Card Added to Nova Mars

Adding a Light Sensor to the Function Card

To add a Light Sensor to the Function Card, click the top icon labelled EXTERNAL DEVICE.

The following window will be displayed:

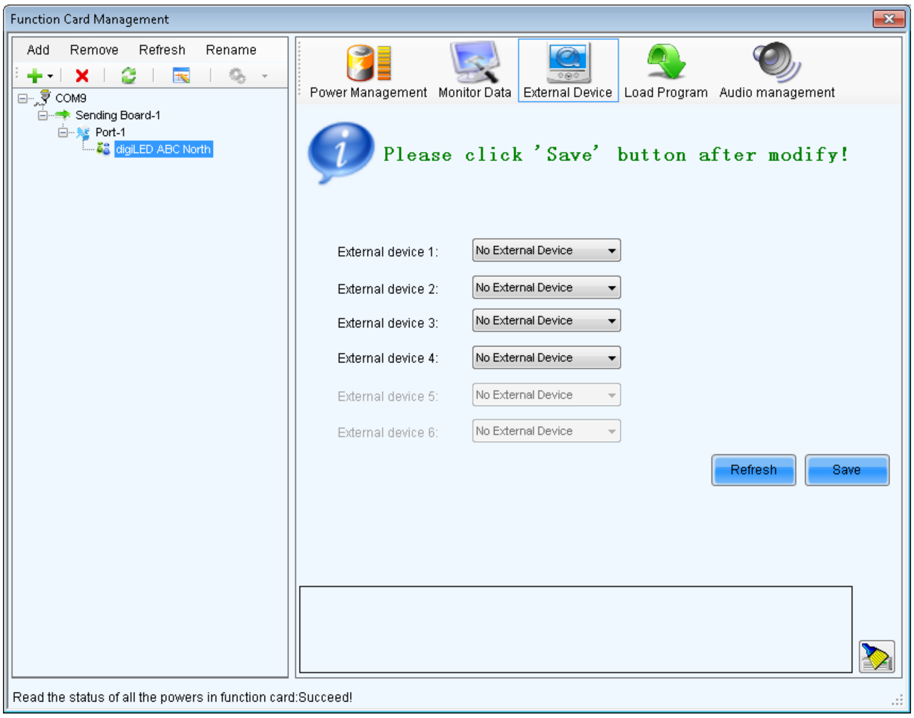

Figure 101 - the External Device Window

From the dropdown list beside EXTERNAL DEVICE 1, select LIGHT SENSOR.

Click the SAVE button to apply the change.

A confirmation dialogue will appear sating that the save process completed successfully.

The window should now appear as follows:

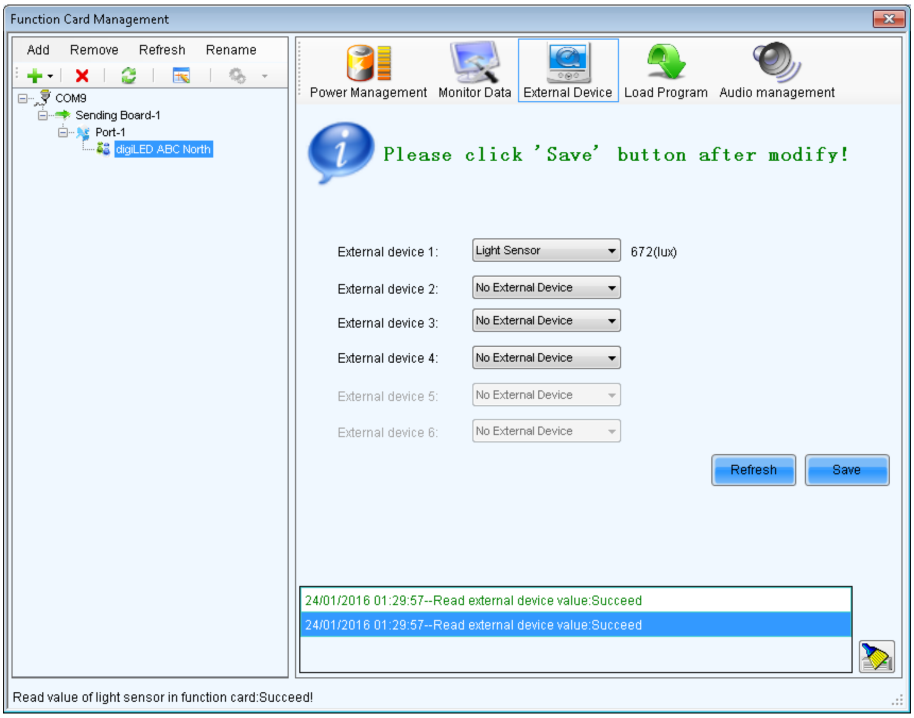

Figure 102 - Light Sensor Added to External Device Window

To display a real-time Lux value from the Light Sensor, click the REFRESH button.

Please note, it is OK to click the REFRESH button as often and as fast as required to verify the changing values of the Light Sensor are functioning correctly.

As opposed to the brightness adjustments to the screen, the Lux values should change in real-time as the Light Sensor is covered / uncovered.

This completes the configuration and setup of the Light Sensor and Function Card.

Configuring Brightness Control with the ABC

Please note - to accurately follow these instructions a Screen Setup / Display Connection should have been Programmed, Sent and Saved before proceeding with an ABC setup.

With the setup of the Function Card and Light Sensor complete, the Brightness Control section of Nova Mars must now be configured to use the values from the ABC.

To start, ensure you are logged in to Nova Mars as an advanced user (see chapter at start of document)

From the top level of Nova Mars, click the Brightness Icon to enter the Brightness Control Window, displayed as below:

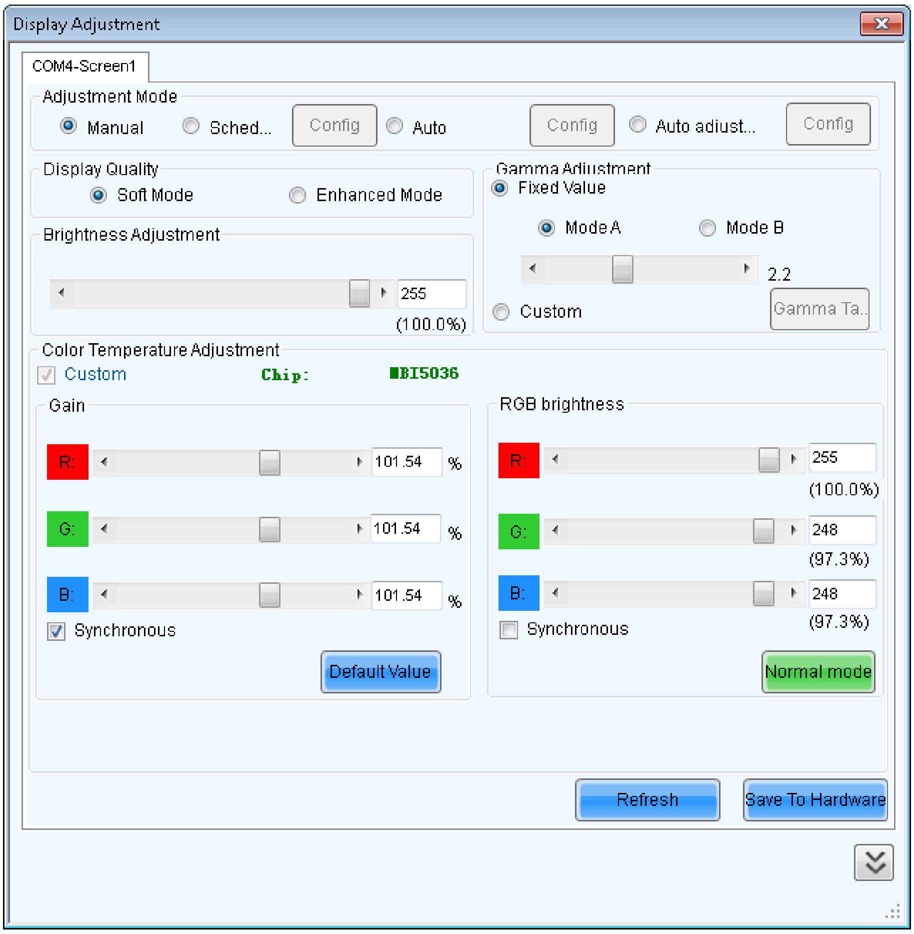

Figure 103 - Brightness Control Window

At the top of this window, click the radio button AUTO.

The following window will be displayed:

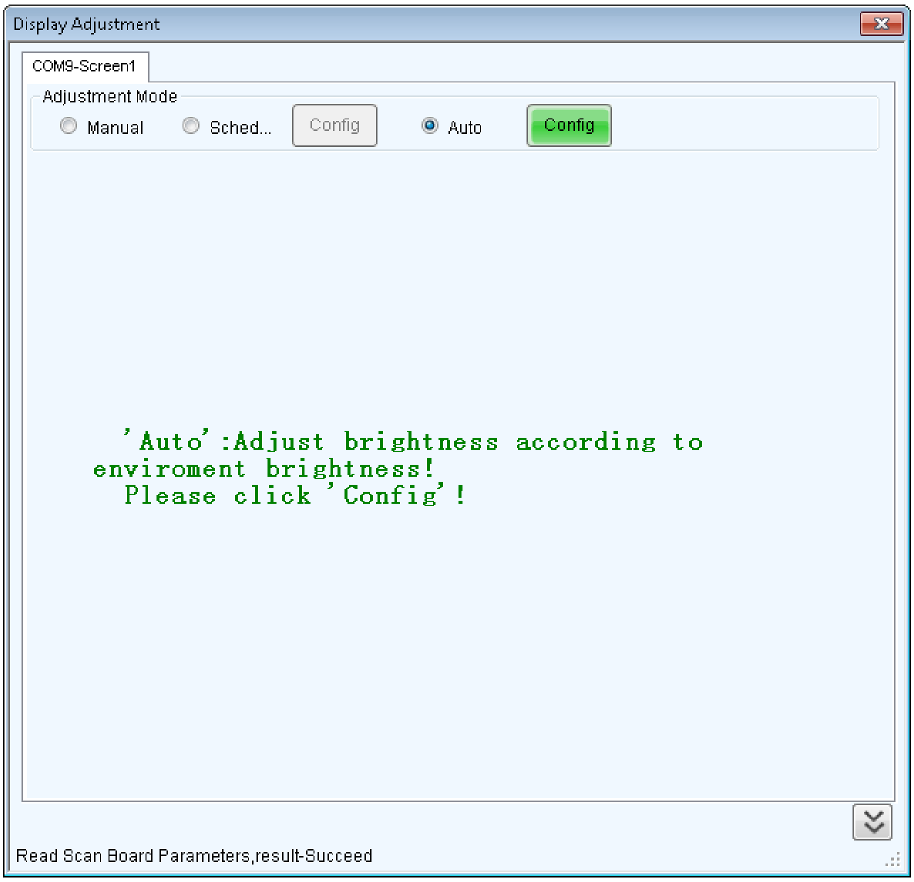

Figure 104 - AUTO warning without setup

The warning displayed is saying that and ABC has never been configured before on this virgin installation of Nova Mars.

Click CONFIG to continue.

The following window is now displayed:

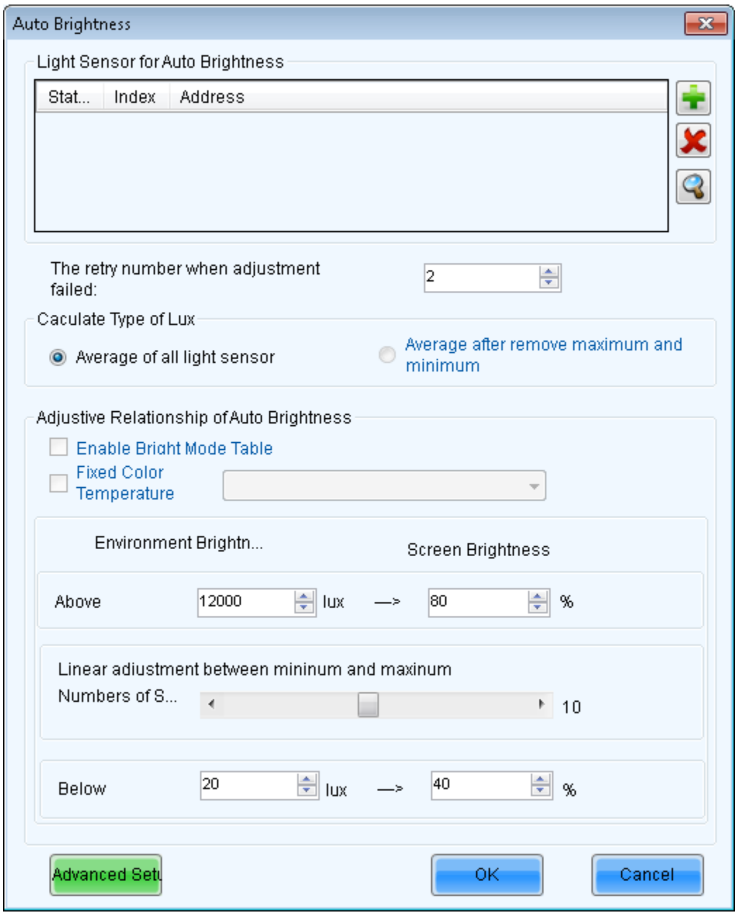

Figure 105 - The Auto Brightness Config Window

Due to the ABC never having been used before, the top box of the window (labelled Light Sensor for Auto Brightness) is empty.

To add the Light Sensor click the green + icon.

The software will now auto detect any Light Sensors within the system and suggest them in the follwing window:

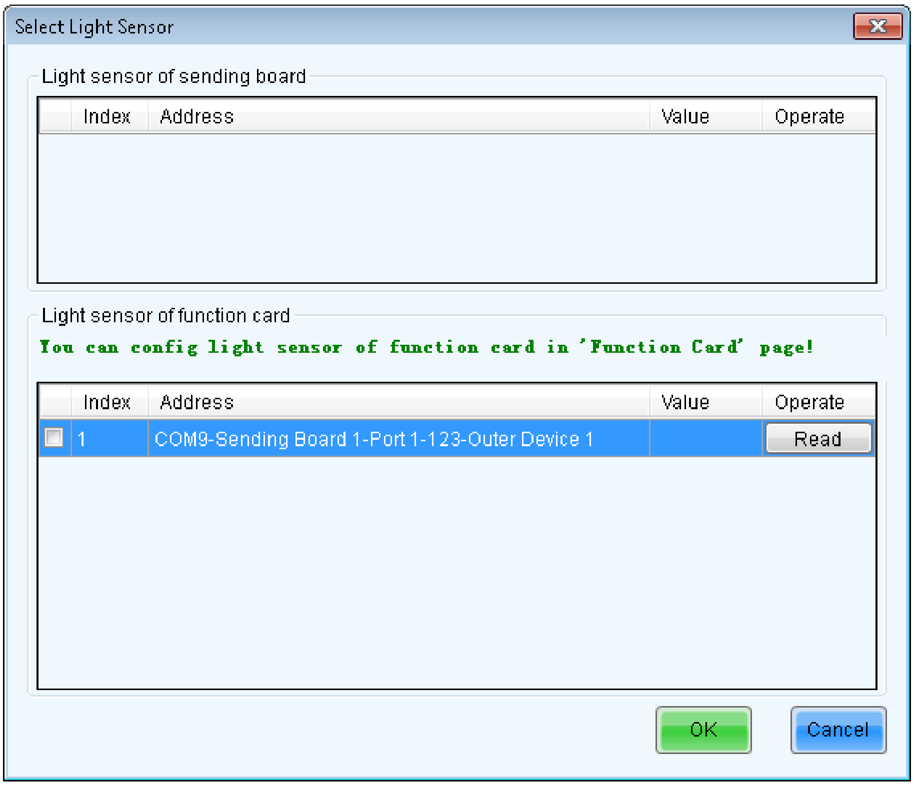

Figure 106 - Light Sensor Selection

If only 1 light sensor is connected to a Function Card, only 1 item will be offered in the lower half of the window, the INDEX box.

Tick the tick box beside the Sensor's Index Number to enable ABC via this Light Sensor.

Clicking the READ button will verify that the Light Sensor is sending Lux values to the main Nova Mars program (a value will be displayed in the VALUE column)

Click OK to finalise the Light Sensor / Brightness pairing.

Calibration

Having configured Nova Mars to accept Brightness Control Data from a Light Sensor, the next step is to calibrate the Screen's response to a given Lux value.

The text book way to do this is to record a max Lux value at midday at the screen location.

In addition, a midnight Lux value should be taken and recorded.

With both of these values known, it is then possible to configure how the LED screen's brightness is adjusted as the 24 hour clock transitions from day time to night time.

Realistically speaking however it is rare that technicians are present to record the midday and midnight Lux value. In this case, guestimates can be made that are later refined if the screen is reported to be "too bright" or "too dark" .

Calibration us undertaken in the lower half of the Auto Brightness Config Window:

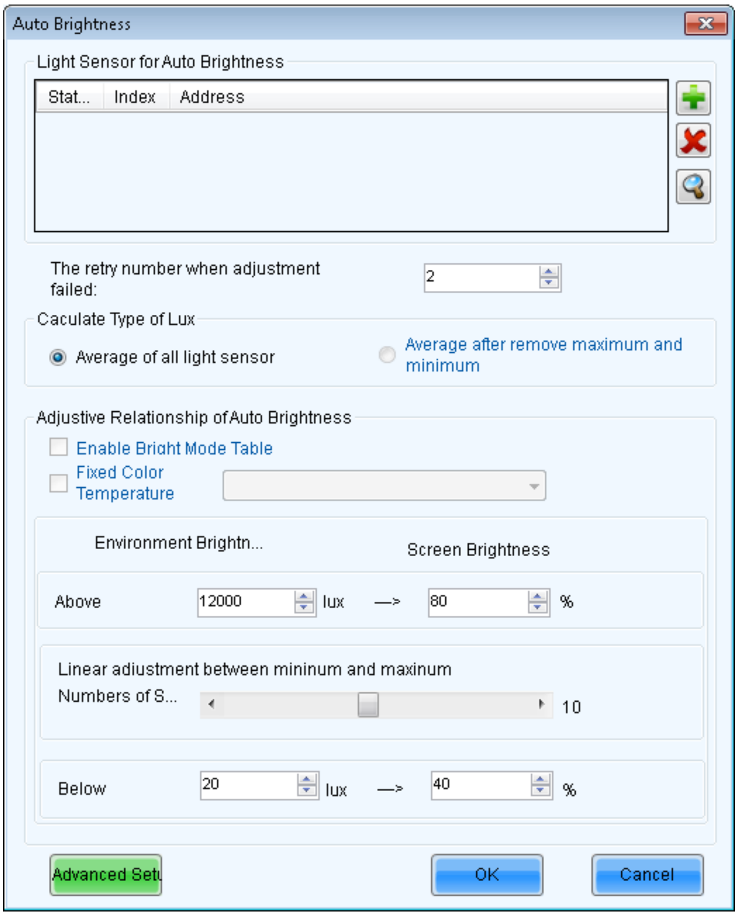

Figure 107 - Auto Brightness Config Window

Environment Brightness to Screen Brightness

The way to 'read' the environment brightness section of the window is shown below:

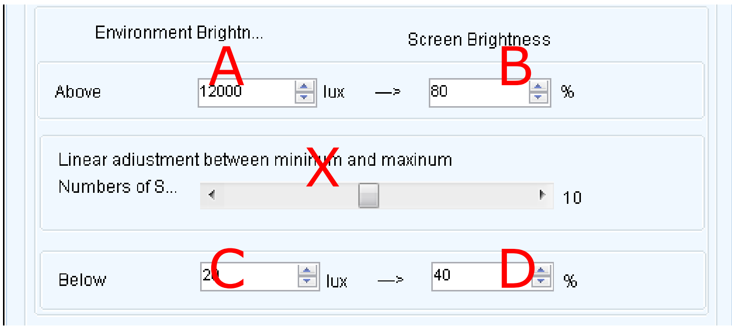

Figure 108 - Environment Brightness Relationship Config

When the Lux level exceeds' A', set the Screen Brightness to 'B'.

When the Lux level is lower than 'C', set the Screen Brightness to' D'.

Between these two conditions there should be 'X' different steps in the brightness scale.

The value for 'A' should be chosen from real-world recordings taken on a full sunshine day at midday.

The value for 'B' is a screen-owner decision based on the maximum screen brightness that is ever desired.

The value for 'D' should be set from the Lux level recorded at midnight at the screen location.

The value for E should be decided by the screen owner based on the minimum operating brightness they ever wish to see the screen run at.

The value for 'C' is a screen owner / user preference based on how many steps they would like to be seen as the Screen transits from daytime to dusk to night time operation.

Once appropriate user values have been entered, click OK to return to Auto Brightness operation of the screen.

Peak Removal

In situations where from time to time, the Light Sensor may pick up on stray light readings, the 'Average After' setting can be used.

A typical example of this may be found where passing cars can occasionally dazzle the Light Sensor with their headlights and cause spurious readings.

To enable 'Average After' , click the radio button in the centre of the Auto Brightness Window labelled AVERAGE AFTER REMOVE MAXIMUM AND MINIMUM.

Click OK at the bottom of the window to confirm changes and return to Auto Brightness operation.

Enable Bright Mode Table

The enable Bright Mode Table setting allows the colour temperature of the screen to be varied from daytime to night time.

Please request specific advice from digiLED if it is felt this feature is needed.

Advanced - Response Time and Averaging

A Nova Mars ABC system will typically work well with only the setting above configured.

If however it is felt that the response time or Lux Averaging of the system needs to be altered, these can be configured via the Bright Adjust Tool.

Troubleshooting - Light Sensor

ABC operation relies on both the hardware and software being configured correctly.

Hardware issue can easily be checked by verifying that the Light Sensor is generating valid Lux readings when refreshed.

Check the Lux value of the Sensor by entering the Function Card menu,clicking the EXTERNAL DEVICE icon and hitting REFRESH to update the displayed Lux value beside the sensor as shown below:

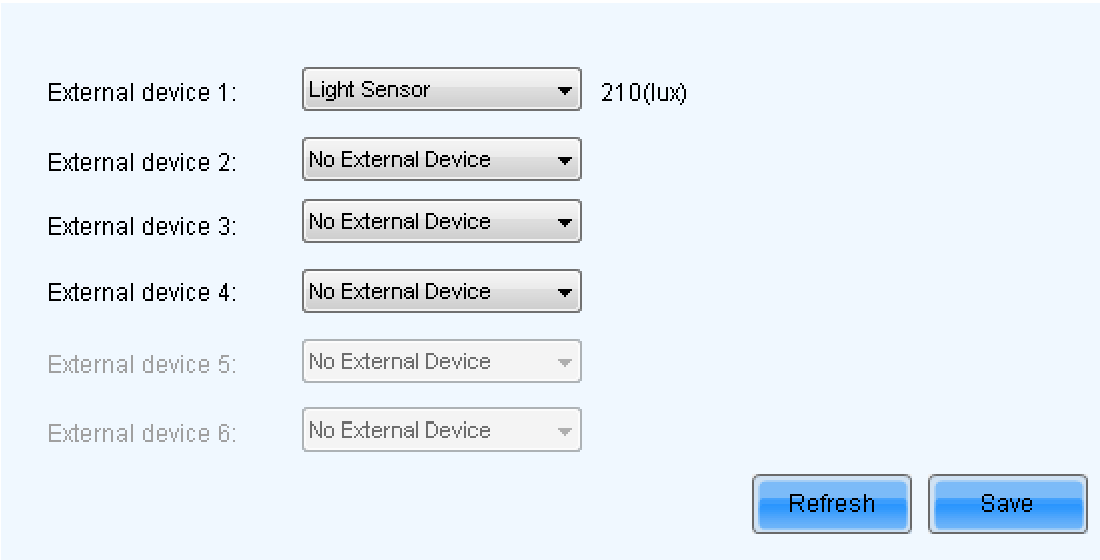

Figure 109 - Refreshed data from Light Sensor

When functioning correctly, the Lux value will change instantaneously with every REFRESH if you cover, then expose the Light Sensor.

A disconnected Light Sensor will generate error messages in the lower dialogue boxes as shown below:

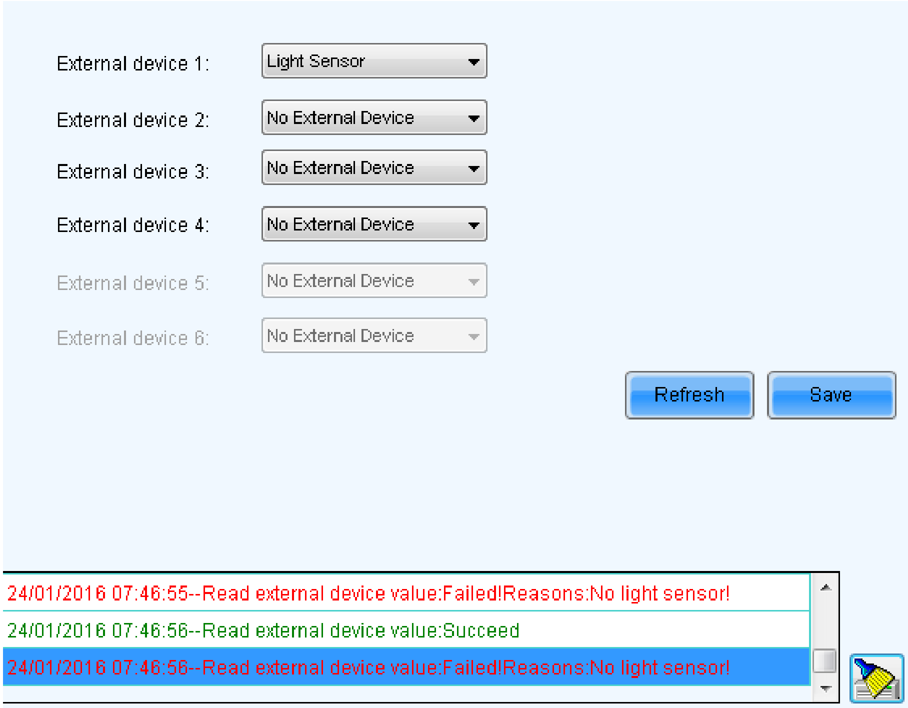

Figure 110 - Disconnected Light Sensor Symptoms

Troubleshooting - Function Card

When adding a function card you may see the warning message as below:

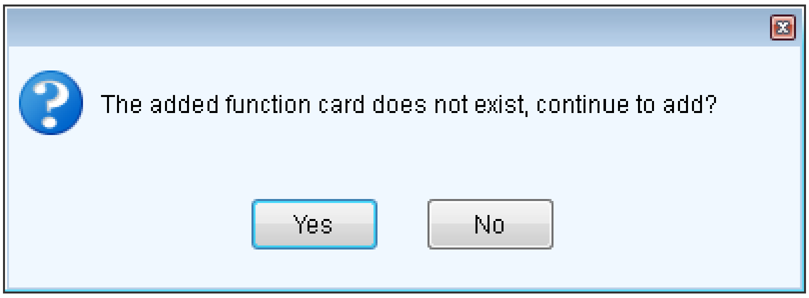

Figure 111 - Add Function Card Warning

Do not ignore this !

This window is warning that Nova Mars cannot see a Function Card at the location you have specified.

Please check if incorrect setting have been used in the Add Function Card window:

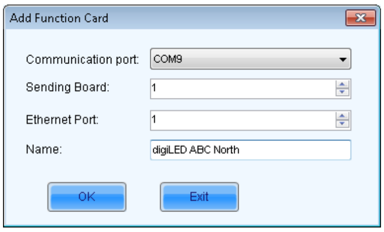

Figure 112 - Add Function Card - Correct Parameters ?

Check for example that the ETHERNET PORT selected correlates to the Navigator-NV port that has the ABC plugged in.

If all these settings are correct and the problem persists, it is most likely a Cat6 data cable fault between the Navigator-NV and the Function Card.

This can be tested by examining the data indicator LED on the Function Card.

A Function Card with valid digiDATA will flash the indicator LED once every 2 seconds.

Missing digiDATA will cause the LED to flash once every 4 seconds.

An additional test is to connect an LED panel to the loop-through digiDATA output of the Function Card. If the Navigator-NV is connected correctly, a section of the video image should be displayed on the LED panel.

If no image is seen (while other Navigator-NV ports are showing an image) a Cat5 cable fault is the probable cause.

Troubleshooting - Bright Adjust Tool

To configure an ABC, Nova Mars must communicate with a small external program called Bright Adjust Tool.

By default, when Nova Mars is installed and launched, Bright Adjust Tool will also run in the background.

If you mouse-over the mini icons beside the Windows desktop clock (bottom right of the task bar) you should see a small sun icon.

This is the Bright Adjust Tool running as a background task on the Windows PC.

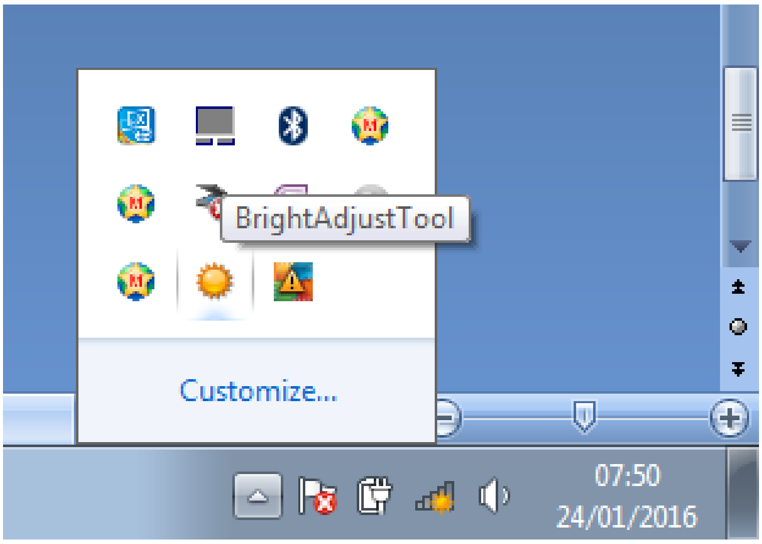

Figure 113 - Bright Adjust Tool Icon

If this icon is missing or greyed out, it is likely that a windows defender process or antivirus has prevented it from installing or running correctly - hence causing problems with ABC.

Bright Adjust Tool will also show in Windows Task Manager as standalone process.

It is essential for correct ABC operation that Bright Adjust Tool is not only running but is also fully enabled within anti-virus and firewall settings on the PC in question.

Please seek professional advice from your IT administrators if you suspect that Bright Adjust Tool may be being blocked by firewalls or anti-virus programs.

If the .exe file location is needed for admin purposes this is commonly found at

C:\Program Files (x86)\Nova Star\NovaLCT-Mars\Bin\BrightAdjustTool\BrightAdjustTool.exe

Monitoring

Prerequisites

Parameters

Reporting

SMPT Settings

Email Recipients

Calibration

Introduction

Calibration is a recently introduced technique that allows the colour and brightness uniformity / appearance of an LED screen to be improved.

Broadly speaking, the process works by measuring the brightness and colour of every single pixel in a screen and adjusting over-bright pixels down to a more average value.

Given that every single pixel within a screen consequently needs an adjustment value, it can be seen that the quantity of data and its management can quickly spiral.

Due to this, digiLED have worked with Nova Star to create a section of Nova Mars to effectively manage and apply this data.

Please read all section of this chapter for a full overview of this very advanced topic !

Turning Calibration On an Off

To turn calibration on and off, launch the software Nova Mars LCT from your windows PC.

Ensuring the USB cable is in place from PC to Navigator-NV, login in to the advanced user controls by clocking on USER > ADVANCED LOGIN.

The advanced password is **admin**

Check that comms are established with the Navigator-NV by checking the information display window says *Control System: 1*

Click the CALIBRATION icon to enter the Calibration menus.

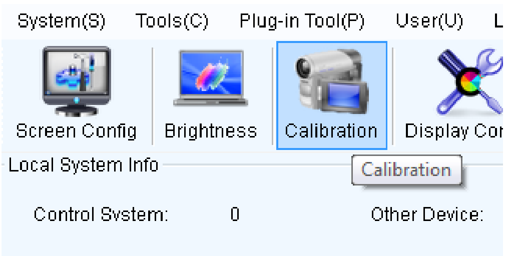

Figure 114 - Calibration Icon

The Screen Calibration Menu will now be displayed.

In the bottom left hand corner of the window is a drop-down menu with three options for Calibration:

- Disable
- Brightness
- Brightness and Colour

Selecting any one of these three will change the appearance of the screen in real-time to the selected setting.

In theory, Colour Calibration is an enhanced version of Brightness Calibration. Practically however, either can be selected when a user wishes to enable Calibration on the LED screen.

To complete your selection and make the change permanent, click the SAVE button to finalise the process

Recalibration Operations Overview

At the time of writing, digiLED LED panels may be supplied with two types of calibration system depending on the screen spec.

The older legacy version relies on the manipulation of a Microsoft Database of calibration data and is intrinsically linked to the correct data being applied to the correct LED tiles / panels. As such, this is a more laborious / problematic process unless strict instructions are adhered to.

The most modern digiLED LED screens have a greatly simplified calibration data system where the data for each and every LED tile is stored inside that LED tile on a small memory chip.

Configuration and management of this newer type of calibration is significantly easier that the calibration options of just a few year ago.

If your digiLED screen has this newer version, you're a lucky guy !

Recalibration Operations (internal memory)

This process refers to the newer calibration system where the calibration data for every LED tile is stored within that LED tile.

The most common way in which this process is used is when a replacement tile is taken from a spares kit and fitted to a screen.

It is also applicable to recalibration operations following a Scancard replacement.

Preparation

This process is best undertaken with a single panel of digiLED screen attached to a Navigator-NV. If this is not possible however, please ensure a screen has been programmed and pixel mapped before the recalibration is attempted. (the calibration process reads parameters back from the pixel mapping to work correctly)

Recalibrating

Due to the latest digiLED screens having an internal memory chip onboard every LED tile, a tile-change recalibration is now significantly easier than with previous generation LED screens.

In summary, the process of recalibrating an LED tile after a tile swap is a two stage process:

1. Read the calibration data from the LED tile to the Scancard
2. Save the calibration data on the Scancard.

This is done in the following way:

Assuming a new LED tile has been fitted into a new location in a screen, open the control software Nova Mars.

Login to the software as an advanced user with the password admin .

The software should appear as below:

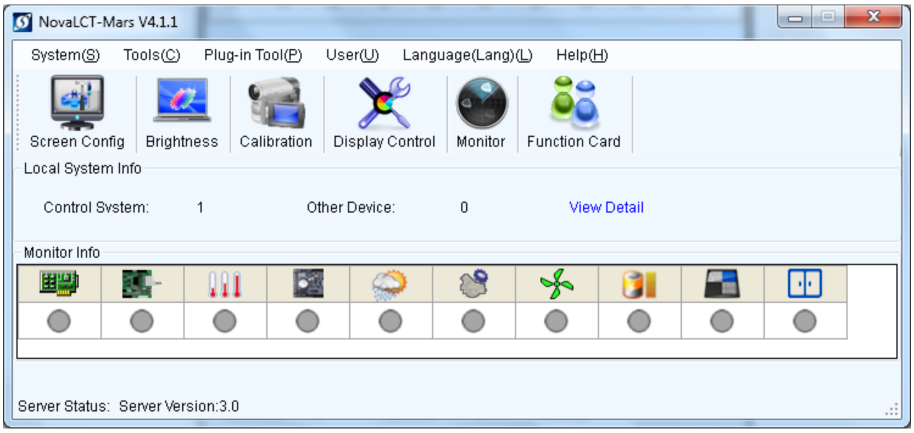

Figure 115 - Main Window, Nova Mars Software

Click on the TOOLS(C) menu header from the top menu bar.

Now click on the menu item LIGHT PANEL FLASH(U) . The following window will be displayed:

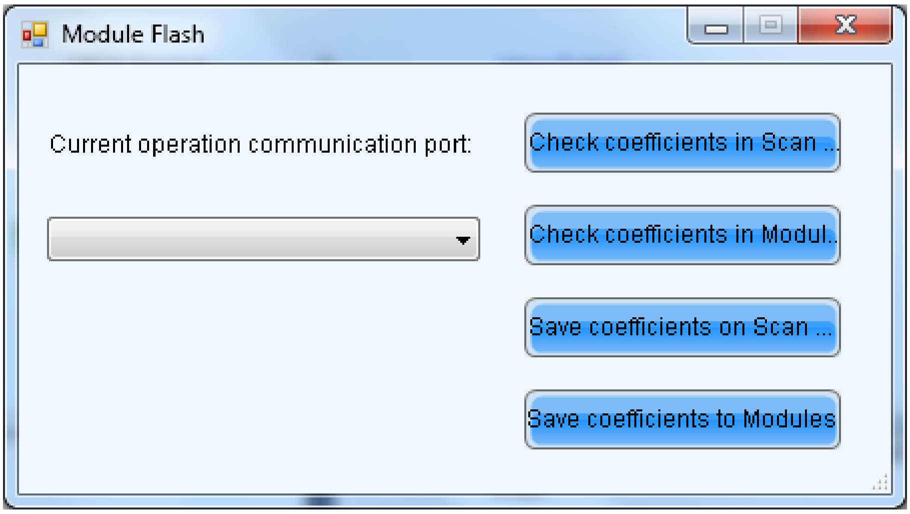

Figure 116 - Light Panel Flash Window

CAUTION - OF THE FOUR BUTTONS ON THE RIGHT HAND SIDE OF THIS WINDOW, THE BOTTOM BUTTON "SAVE COEFFICIENTS TO MODULES" SHOULD BE CONSIDERED OUT OF BOUNDS.

DO NOT CLICK THIS BUTTON UNDER ANY CIRCUMSTANCES UNLESS SPECIFICALLY INSTRUCTED BY DIGILED TECHNICAL STAFF !

Taking note of the above warning, click the second button from the top: CHECK COEFFICIENTS IN MODULES [13]

Observing the new LED tile in the screen at this point should reveal a 'wipe down' of calibration data being applied to the new LED tile. This is the visible process of each and every LED pixel having the correct calibration data applied from the internal memory of the LED tile.

All panels in the screen will now display calibration data as loaded from their internal memory chips.

If this calibration data appears correct, it is now necessary to make this change permanent and save the data on the Scancard.

To do this, click the third button down: SAVE COEFFICIENTS ON SCANCNARD .

The calibration data is now permanently written to the Scancard memory and will be applied to the LED tiles every time the Scancard boots up.

This completes the LED tile change recalibration using internal memory.

Recalibration following a Scancard Swap

In the event of a faulty Scancard having to be replaced in a screen, the above process is equally applicable.

Please note that the screen setup and pixel mapping should be undertaken / reapplied before any calibration operations are used.

Recalibration Operations (external database)

Please note that for the remainder of this chapter on calibration, all instructions relate to the older style of calibration management - applicable to screen with no internal memory on the LED tile.

[13] In the language used by the software developers of Nova Mars, the word MODULE refers to what digiLED call an LED TILE.

File Types

Nova Mars software versions up to 4.1.1 are capable of loading calibration database files with the following extensions:

- .mdb
- .coef

From version 4.2.X onwards, the list is expanded to:

- .mdb
- .db
- .coef
- .scrcoef
- .cabcoef

If you experience difficulties loading a calibration database it may be that the version of Nova Mars in use to too old and not backwards-compatible.

Recalibrating a Panel - New Scancard, Single Panel Screen

When a virgin Scancard is selected from the spares kit, the memory that should contain the calibration data will be blank and no Calibration effect will be visible.

The calibration data needs to be acquired and written to the Scancard either from the Memory on Module or Master Calibration Database.

digiLED maintain an archive of all calibration data from the time of screen manufacture. Please contact digiLED support for the appropriate database for your screen.

To extract the correct data from the database and write it to the Scancard, launch the Nova Mars LCT software on your PC.

Preparation

Nova Mars LCT needs to be programmed so that it understands there is only one single panel of HRi screen attached. To do this, please follow the quick guide in the Appendix titled "Screen Pixel Mapping - A Quick Example" but with one small change. Whereas in the Appendix example, a screen is pixel mapped with 6 x 4 panels in it, in this case, use 1 x 1 panels in the pixel mapping. All other procedures detailed in the Appendix should be followed as per the example.

Recalibrating

Login and enter the calibration section of the software as described in the chapter above "Turning Calibration On and Off"

Click on the third tab at the top of the window marked MANAGE COEFFICIENTS.

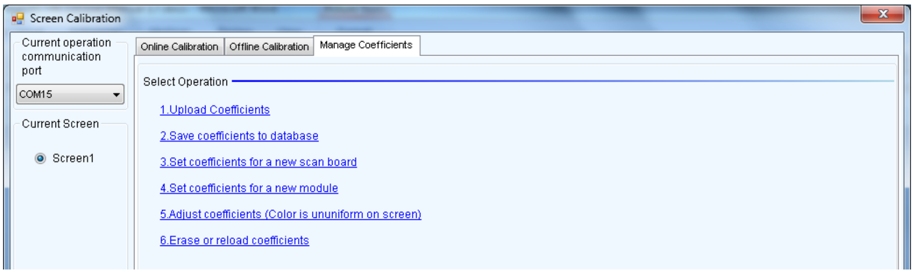

Figure 117 - Calibration Menu - Manage Coefficients

Select option 1 UPLOAD COEFFICIENTS

The Select Database window will now open.

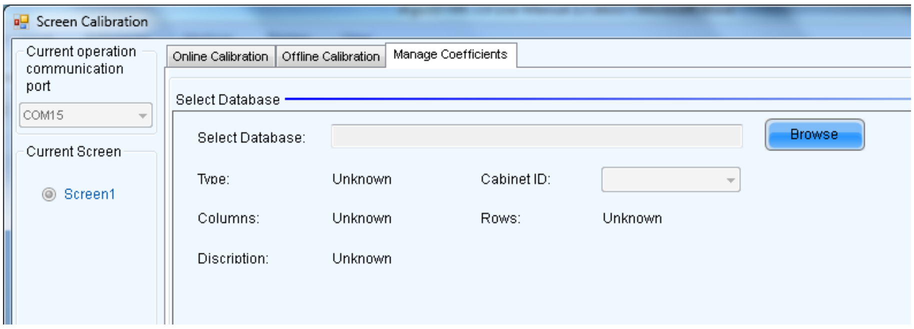

Figure 118 - The Select Database Menu

Click the BROWSE button to select the .mdb file from its stored location on your PC or USB stick.

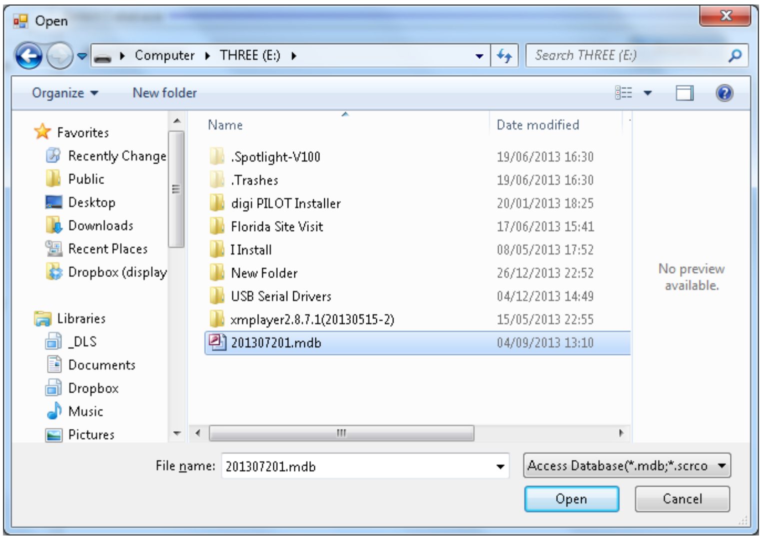

Figure 119 - the Open .mdb File Window

Once the .mdb file is opened, the greyed out areas of the calibration widow become active. The window will display the pixel resolution of a panel and the drop down menu will now have a complete list of ever single panel in the database.

It is now necessary to confirm the serial number of the panel with the new Scancard. For example DHK910-0074.

Panel 74 must then be selected from the drop down menu so that the correct data is loaded.

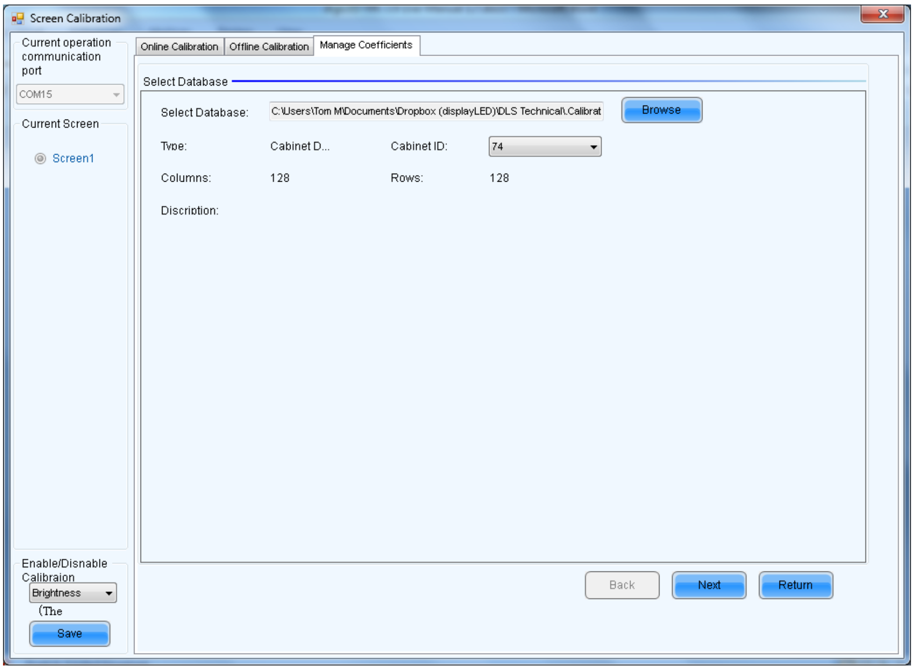

Figure 120 - Selecting Panel 74 from the Drop Down Menu

Now click the NEXT button on the bottom right of the window. The following window will be displayed:

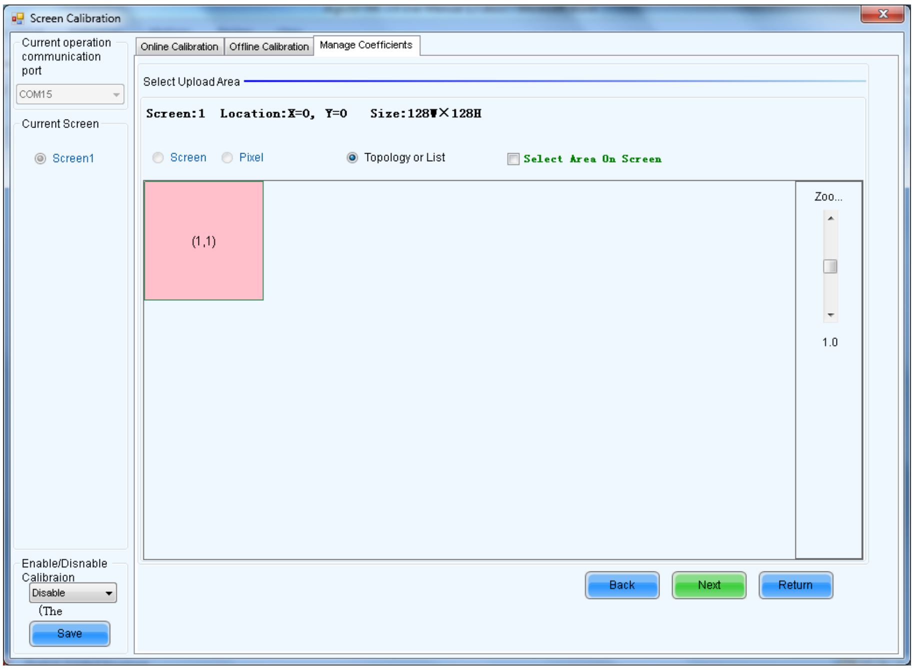

Figure 121 - the Select Upload Area Window

Please note - It is essential that the screen programming has been carried out before the screen calibration. It was the process of programming a 1 x 1 grid of screens at the start that means that only a single panel is now correctly displayed in this window.

Click the panel displayed in the window. It will change to a Yellow colour.

To continue, click the NEXT button. The following window will then be displayed:

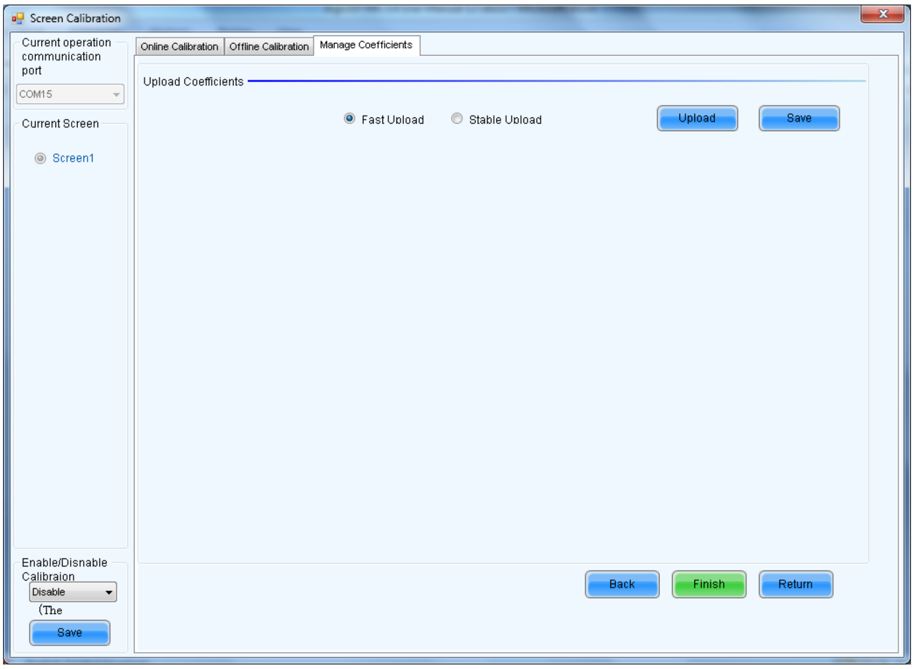

Figure 122 - the Fast or Stable Upload Window

Click the radio button marked STABLE UPLOAD.

Next, click the UPLOAD button.

A percentage progress window will now be displayed while the data is written to the Scancard:

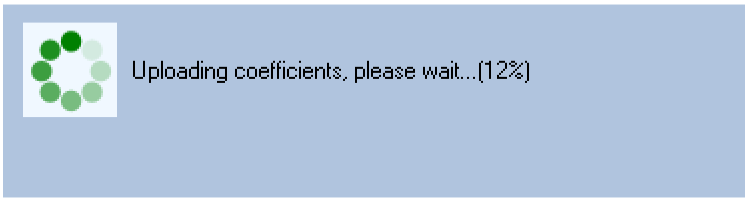

Figure 123 - Percentage Progress of Calibration Data Upload

To finish the process, click the SAVE button followed by the RETURN button.

This completes the process for writing calibration data to a new Scancard.

Recalibrating a Panel - New Scancard, Multiple Panel Screen

Preparation

In advance of calibration writing, Nova Mars LCT needs to be programmed so that it understands where all of the panels of HRi screen are located in the overall screen surface. To do this, please follow the quick guide in the Appendix titled "Screen Pixel Mapping - A Quick Example". The following example applies to a 6 x 4 panel screen exactly as in the Appendix example.

The following panel is assumed to have the serial number 0074:

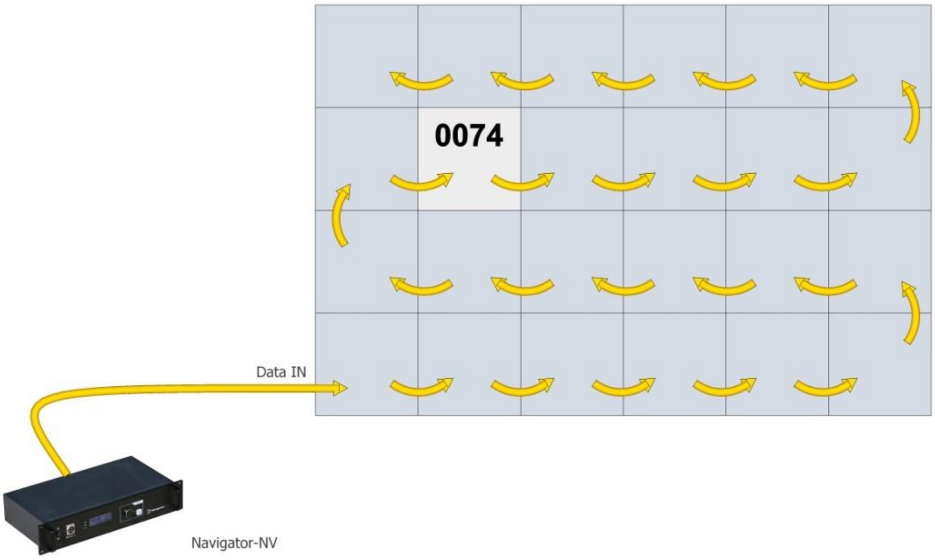

Figure 124 - in this example: Panel 0074

Recalibrating

Login and enter the calibration section of the software as described in the chapter above "Turning Calibration On and Off"

Click on the third tab at the top of the window marked MANAGE COEFFICIENTS.

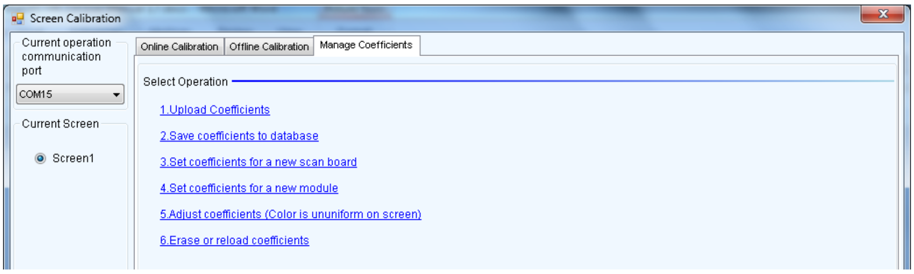

Figure 125 - Calibration Menu - Manage Coefficients

Select option 1 UPLOAD COEFFICIENTS

The Select Database window will now open.

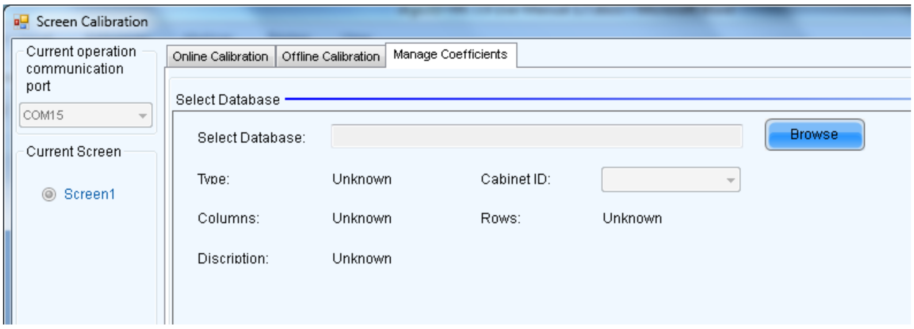

Figure 126 - The Select Database Menu

Click the BROWSE button to select the .mdb file from its stored location on your PC or USB stick.

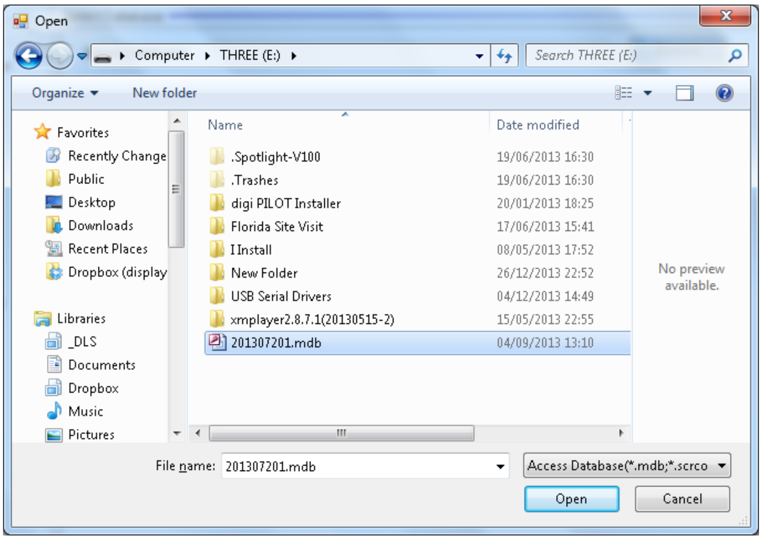

Figure 127 - the Open .mdb File Window

Once the .mdb file is opened, the greyed out areas of the calibration widow become active. The window will display the pixel resolution of a panel and the drop down menu will now have a complete list of ever single panel in the database.

It is now necessary to confirm the serial number of the panel with the new Scancard. For example DHK910-0074[14].

Panel 74 must then be selected from the drop down menu so that the correct data is loaded.

[14] Number 74 is a purely arbitrary number just chosen for this example.

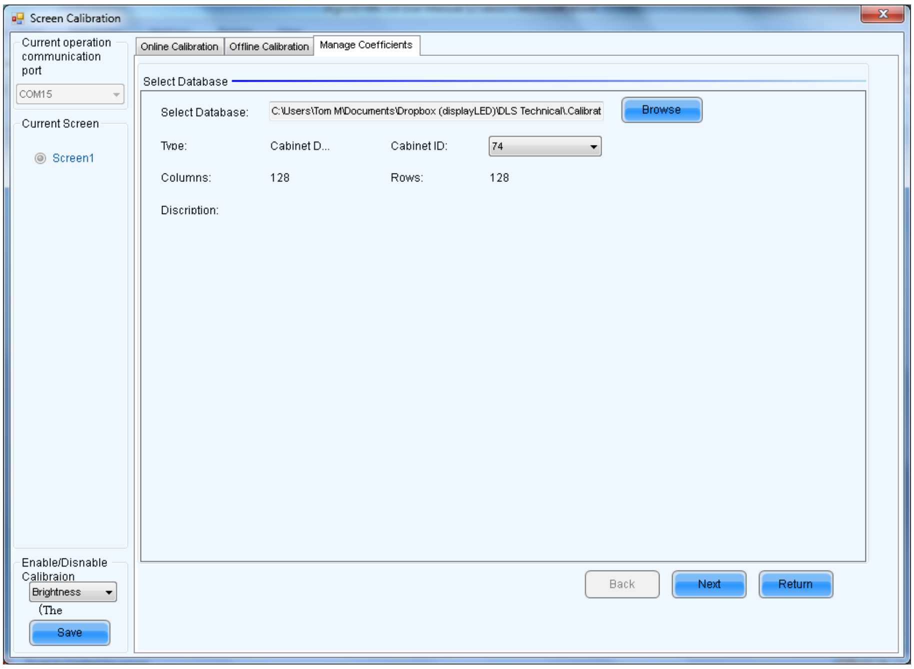

Figure 128 - Selecting Panel 74 from the Drop Down Menu

Now click the NEXT button on the bottom right of the window. The following window will be displayed:

Figure 129 - the Select Upload Area Window

Please note - It is essential that the screen programming has been carried out before the screen calibration. It was the process of programming a 6 x 4 grid of screens at the start that means that the correct grid is now correctly displayed in this window.

Click the panel corresponding to the position of Panel 0074 in the window. It will change to a Yellow colour.

Figure 130 - Highlighting the Location of Panel 0074

To continue, click the NEXT button. The following window will then be displayed:

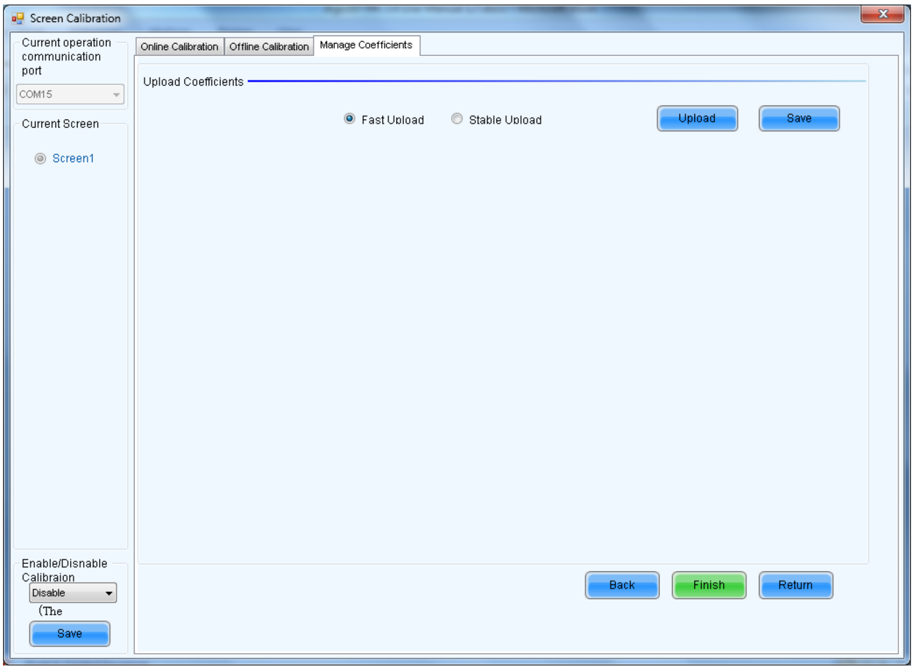

Figure 131 - the Fast or Stable Upload Window

Click the radio button marked STABLE UPLOAD.

Next, click the UPLOAD button.

A percentage progress window will now be displayed while the data is written to the Scancard:

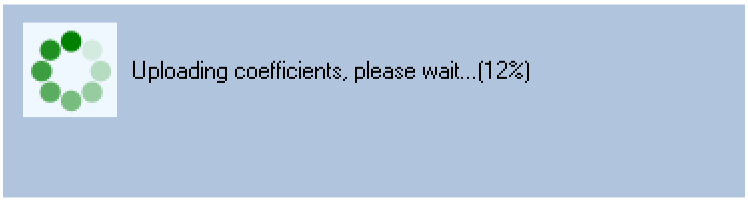

Figure 132 - Percentage Progress of Calibration Data Upload

To finish the process, click the SAVE button followed by the RETURN button.

This completes the process for writing calibration data to a new Scancard.

Recalibrating a Panel - New LED Tile

Preparation

This process is best undertaken with a single panel of HRi attached to a Navigator-NV. Nova Mars LCT needs to be programmed so that it understands there is only one single panel of HRi screen attached. To do this, please follow the quick guide in the Appendix titled "Screen Pixel Mapping - A Quick Example" but with one small change. Whereas in the Appendix example, a screen is pixel mapped with 6 x 4 panels in it, in this case, use 1 x 1 panels in the pixel mapping. All other procedures detailed in the Appendix should be followed as per the example.

Recalibrating

When a tile is selected from the spares kit its serial number will be in the form DHK910 Spare 0**

While it is possible to place Spare 0** into any position of any panel, the calibration will not be correct until the data for Spare 0** has been merged into the main calibration database for that panel and screen.

Because the original factory condition of 4 tiles in 4 locations has been broken by the process of changing a tile, it becomes necessary to generate an entirely new database file for the changed panel.

Specialist software is required to do this.

displayLED offer a new database generation service to all their HRi customers and have a dedicated email address setup specifically for this process. An email should be sent to calibration@displayLED.comcontaining a calibration request along with specific information.

The information required is:

- The serial number of the panel which is to be recalibrated.
- The serial number of the new LED tile which has been fitted to the panel.
- The location (A,B,C or D) to which the LED tile has been fitted.

Please use the location system detailed above in the chapter Identifying Calibrated Tiles.

Once the request is emailed to calibration@displayLED.coma new .mdb file will be generated that is unique to that panel with its new LED tile in place. This .mdb file will be emailed back and can be uploaded to the panel in the following way:

Login and enter the calibration section of the software as described in the chapter above "Turning Calibration On and Off"

Click on the third tab at the top of the window marked MANAGE COEFFICIENTS.

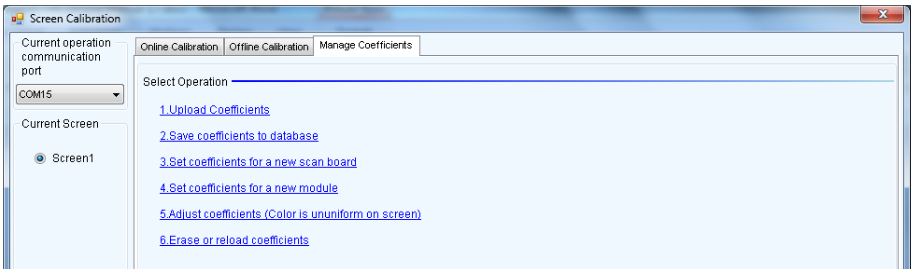

Figure 133 - Calibration Menu - Manage Coefficients

Select option 1 UPLOAD COEFFICIENTS

The Select Database window will now open.

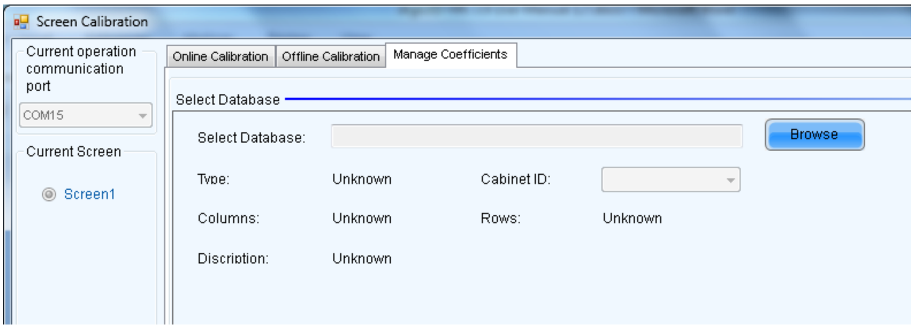

Figure 134 - The Select Database Menu

Click the BROWSE button to select the newly generated .mdb that has just been emailed back.

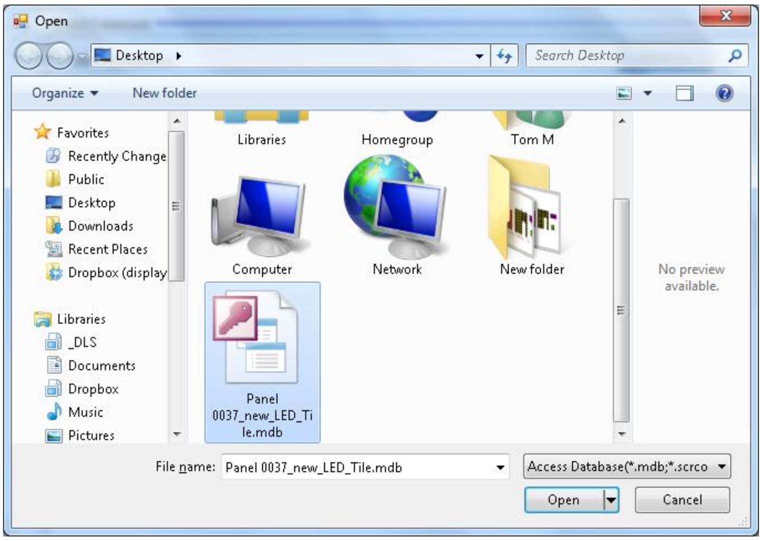

Figure 135 - the Open .mdb File Window

Once the .mdb file is opened, the greyed out areas of the calibration widow become active. The window will display the pixel resolution of a panel and the drop down menu will now have a single panel serial number in it.

This number must agree with the serial number of the panel to which the data is being written. If it does not, an error has occurred in either the reporting or generating of the new calibration data.

Please consult calibration@displayLED.com for further information if this error is found.

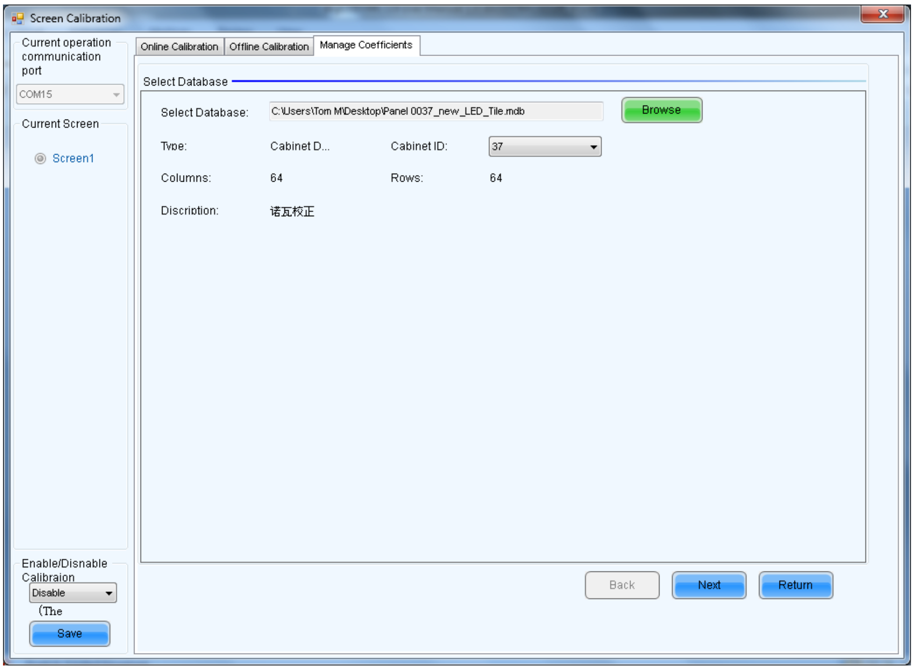

Figure 136 - Selecting Panel 74 from the Drop Down Menu

Now click the NEXT button on the bottom right of the window. The following window will be displayed:

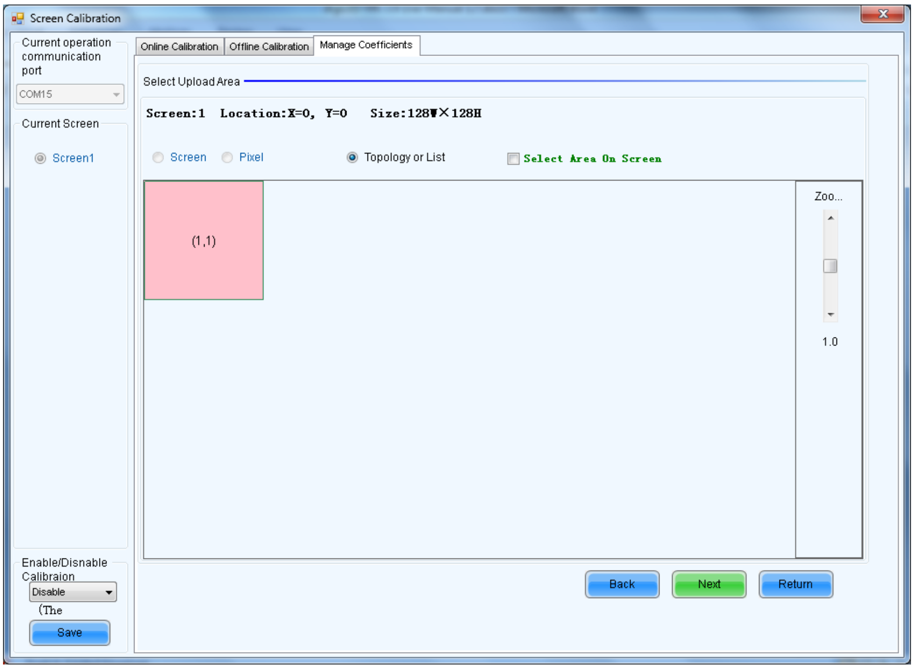

Figure 137 - the Select Upload Area Window

Please note - It is essential that the screen programming has been carried out before the screen calibration. It was the process of programming a 1 x 1 grid of screens at the start that means that only a single panel is now correctly displayed in this window.

Click the panel displayed in the window. It will change to a Yellow colour.

To continue, click the NEXT button. The following window will then be displayed:

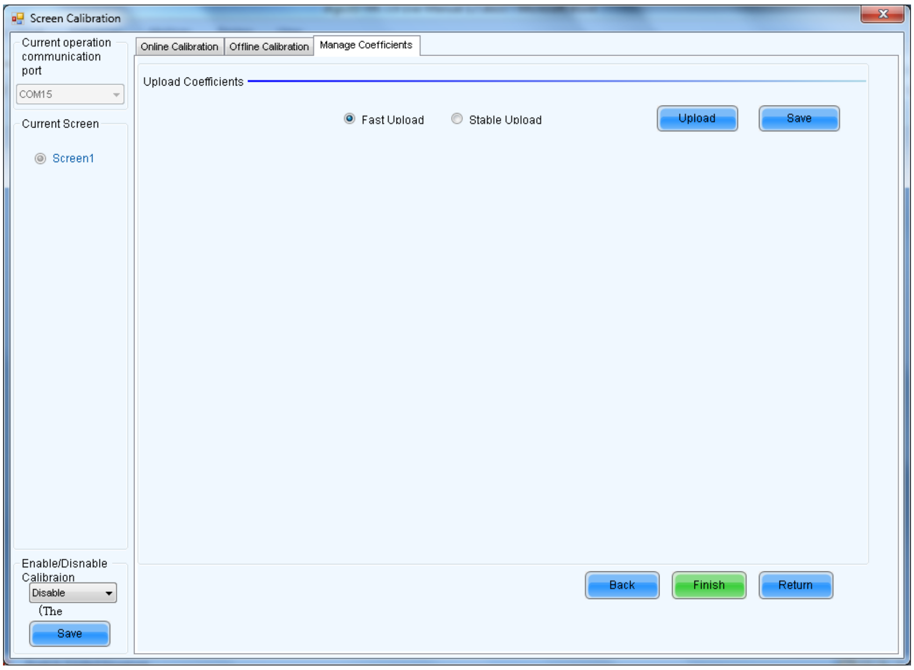

Figure 138 - the Fast or Stable Upload Window

Click the radio button marked STABLE UPLOAD.

Next, click the UPLOAD button.

A percentage progress window will now be displayed while the data is written to the Scancard:

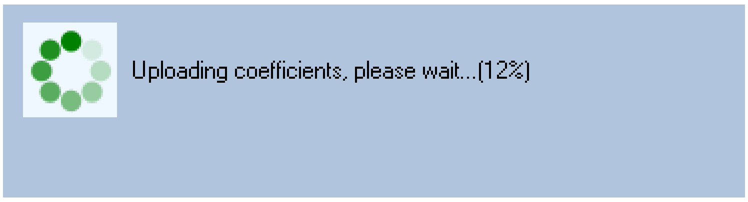

Figure 139 - Percentage Progress of Calibration Data Upload

To finish the process, click the SAVE button followed by the RETURN button.

This completes the process for writing calibration data to a new Scancard.

Firmware

Introduction

The Scancard inside every digiLED panel is the small processor of the panel that decides how many pixels of the overall video image are to be displayed. Further adjustments such as the brightness, gamma and saturation of the pixels in the panel are also controlled by the Scancard.

Diagnosis and remote sensing functions are also controlled by the Scancard in addition to refresh and scan rate settings control.

In short, the Scancard inside the panel is the brains of the device.

The Firmware loaded onto the Scancard is the core set of instructions and operation parameters that all these settings rely on.

The following document describes how to check and if necessary upgrade the Firmware loaded onto a Scancard.

Compatibility

This Firmware procedure has been specifically written with reference to digiLED HRi 3900 LED Panels and their Scancards.

Please consult digiLED technical support before attempting Firmware upgrade procedures on any other panel type.

Software Version

The following Firmware procedure is documented based on Nova Mars version 4.1.1

The procedures can be changed however depending on the firmware version and file locations required.

Firmware File Location

Every time a new version of Nova LCT Mars is installed on a windows PC, the latest publications of firmware are also installed within the Program Files(86) file structure.

The firmware release 4.1.1 for example will be located in

C:\Program Files (x86)\Nova Star 4.1.1\NovaLCT-Mars\Data\Data_Mars_4.1.1.0\RVCard\CommonData

The firmware release for version 4.3.0 for example will be located in:

C:\Program Files (x86)\Nova Star 4.3.0\NovaLCT-Mars\Data\Data_Mars_4.3.0.0\RVCard\CommonData

While it is possible to copy and paste the firmware files from these locations, this still remains the default location to source these files.

Firmware File Type

In the above mentioned folder structure, files are archived for every common type of Nova Receiver Card (Scancard).

The types of Receiver Card available are as follows:

- MRV200
- MRV210
- MRV220
- MRV270
- MRV300
- MRV320
- MRV330
- MRV340
- MRV350
- MRV360

Please ensure the right type of firmware is loaded onto the right type of Scancard.

If you need to cross reference your card type, the information is normally printed on the FPGA chip of the Scancard as shown below:

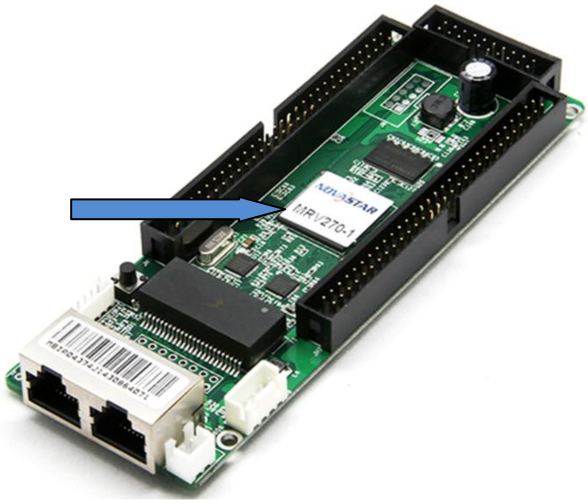

Figure 140 - Scancard Model Number

Setup

The equipment required for this procedure is as follows:

- A Windows PC or Laptop with Nova Mars v 4.1.1 (or appropriate later version) installed.
- An A to B USB Cable.
- A digiLED Navigator-NV or equivalent Processor.
- Power for above devices.
- A Cat5e data cable from Navigator-NV to LED panel.
- The LED panel (and Scancard) intended to be upgraded.

While this example is shown with only 1 LED panel connected, it is possible to do up to 20 LED panels at a time.

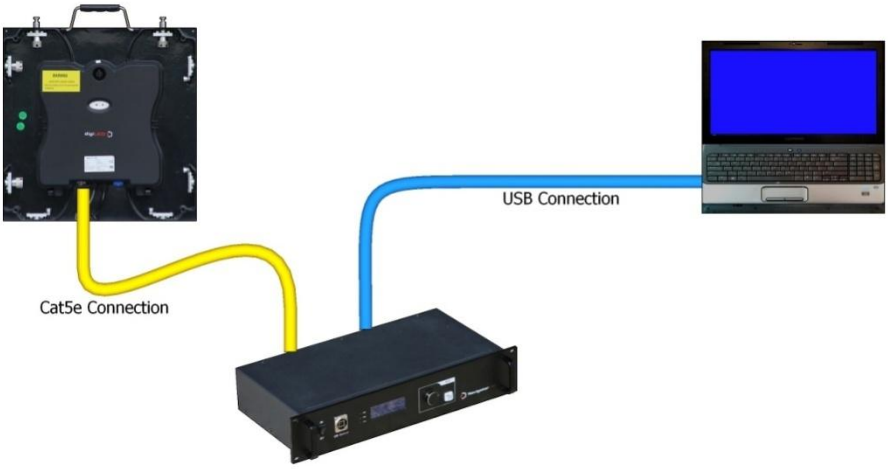

Figure 141 - System Diagram

Warning!

It is critical that there are no power interruptions to either the LED panel or the Navigator or the PC during the upgrade process.

If the power were to brown out or black out during the upgrade process this would render the Scancard useless since it would corrupt the onboard operating system of the Scancard chipset.

Ensure there can be no signal or power interruptions during the upgrade process!

Firmware Procedures

Login

Run the software 'Nova Mars 4.11' on your PC or Laptop.

From the USER menu, click ADVANCED LOGIN.

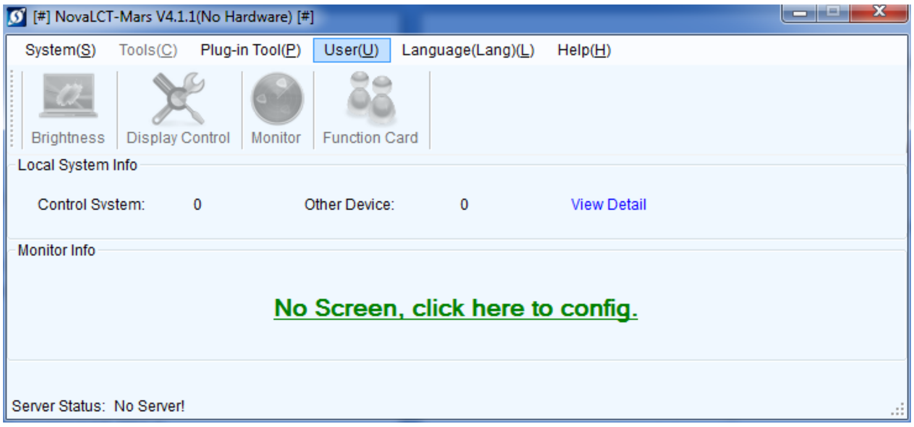

Figure 142 - User Login

Use the password admin to login as an advanced user.

Once logged in, the user interface of Nova Mars will expand to the full featured version.

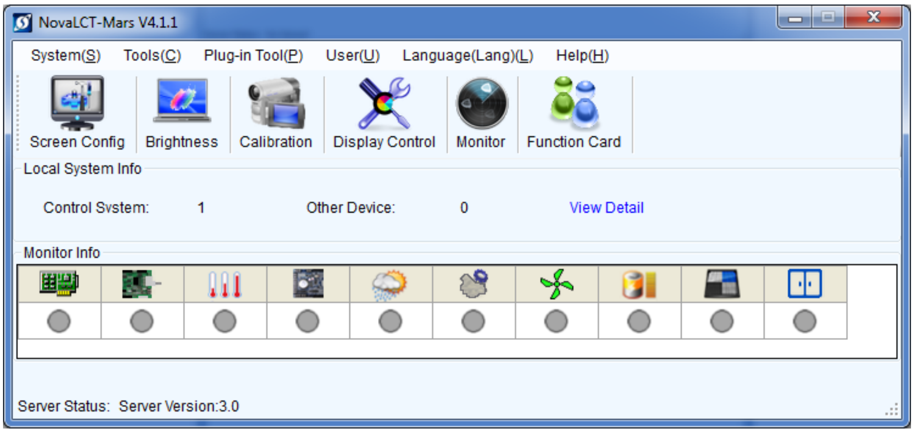

Figure 143 - Full Feature Nova Mars Interface

Firmware Upgrade Application

The Firmware Upgrade application is accessed via a hidden menu within Nova Mars. To access the application, first click on the very top border of the Nova Mars window frame as shown below:

Figure 144 - Click area to access hidden menu

Having clicked in the above area, type the user login password once more:

admin

The secret menu of Nova Mars will now open as shown below:

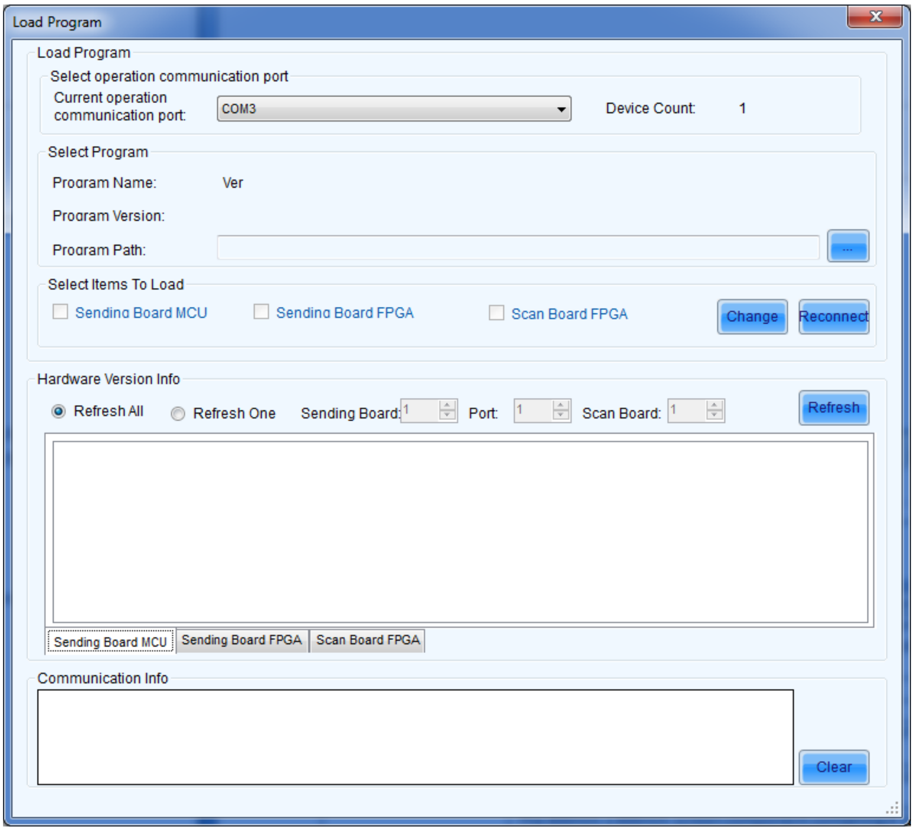

Figure 145 - 'Load Program' - the secret menu of Nova Mars

It is from this window and menu that all Firmware checking and upgrading procedures are undertaken.

Firmware Loading

To load a new Firmware into Nova Mars, first click the '...' button beside the PROOGRAM PATH bar.

A Windows Explorer window will now open allowing you to find the required firmware files in their stored location:

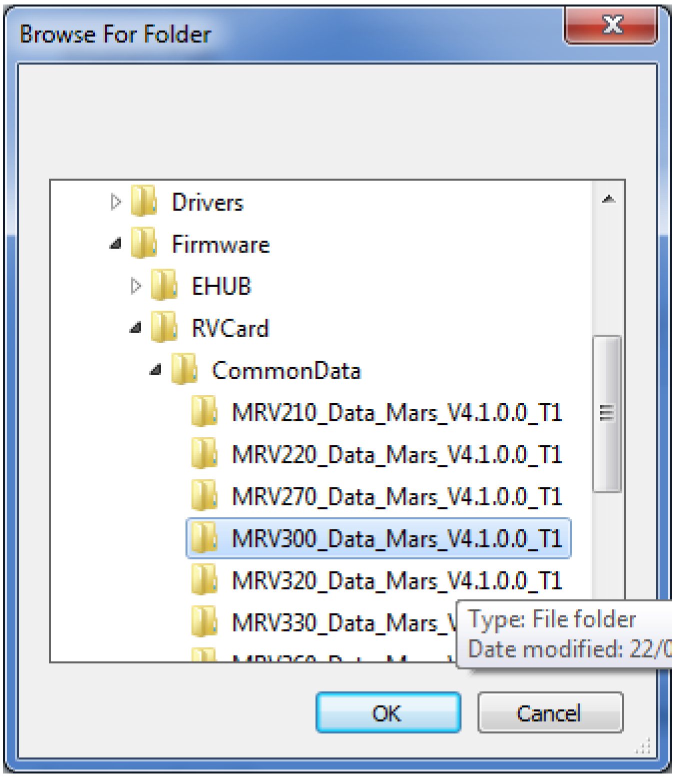

Figure 146 - Windows Explorer Window for file opening.

Click OK to open the correct firmware version for the procedure.

The LOAD PROGRAM window will now show the firmware path in the PRGRAM PATH bar.

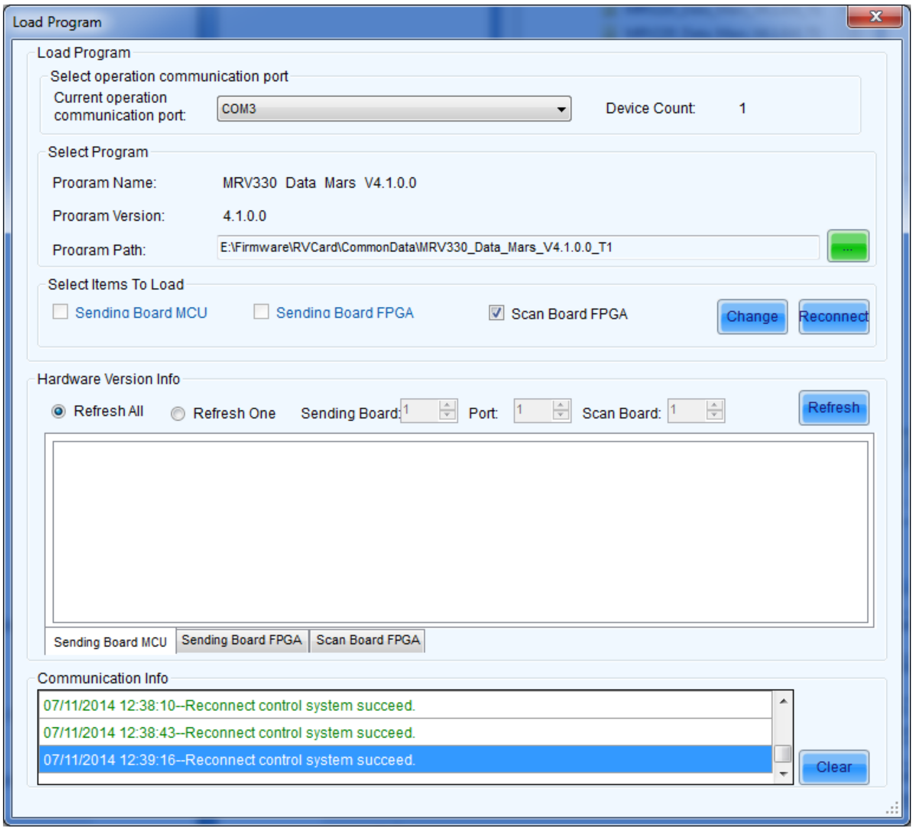

Figure 147 - Firmware loaded into software.

Providing all USB and Cat5 connections are good, the firmware should auto-detect (and tick the box for) SCAN BOARD FPGA meaning that the firmware is ready to send / burn to the Scancard.

Firmware Burning

Before proceeding with this section, ensure that there can be no possible power cuts, cable disconnects or PC / Laptop shutdowns.

Any interruption of the process will kill the Scancard and render it useless !

To burn the new firmware to the Scancard, click the CHANGE button.

The software will ask "ARE YOU SURE?"

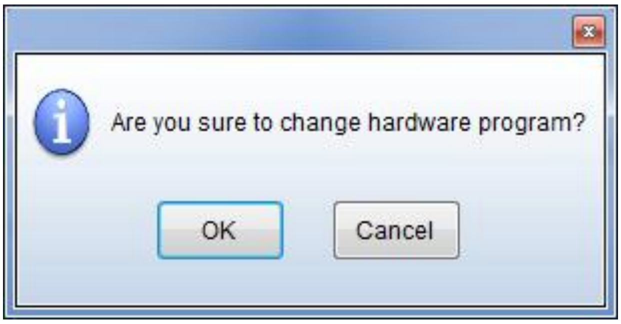

Figure 148 - Confirmation before burn.

Click OK to proceed with the burn process.

The firmware upload an burn process should take approximately 45 seconds. During this time, at the bottom of the window, green text and progress bars will rapidly change as the various components are transmitted to the Scancard.

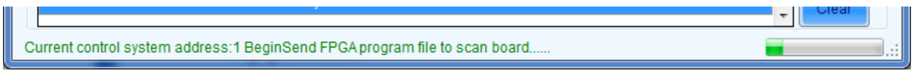

Figure 149 - Progress Information at Bottom of Window

Once completed the software will display and OK notification will be displayed.

Firmware Checking

To verify the Firmware version loaded into (and running on) a Scancard, enter the secret menu of Nova Mars as described above.

At the bottom of the windows, three tabs are visible:

- Sending Board MCU
- Sending Board FPGA
- Sending Board FPGA

Click on the SCAN BOARD FPGA tab.

Above and to the right, locate the REFRESH button.

Clicking the REFRESH button will check and display the Firmware version of the Scancard / Scancards connected . In the example below, a single MVR330 card is shown with Firmware version 4.1.0.

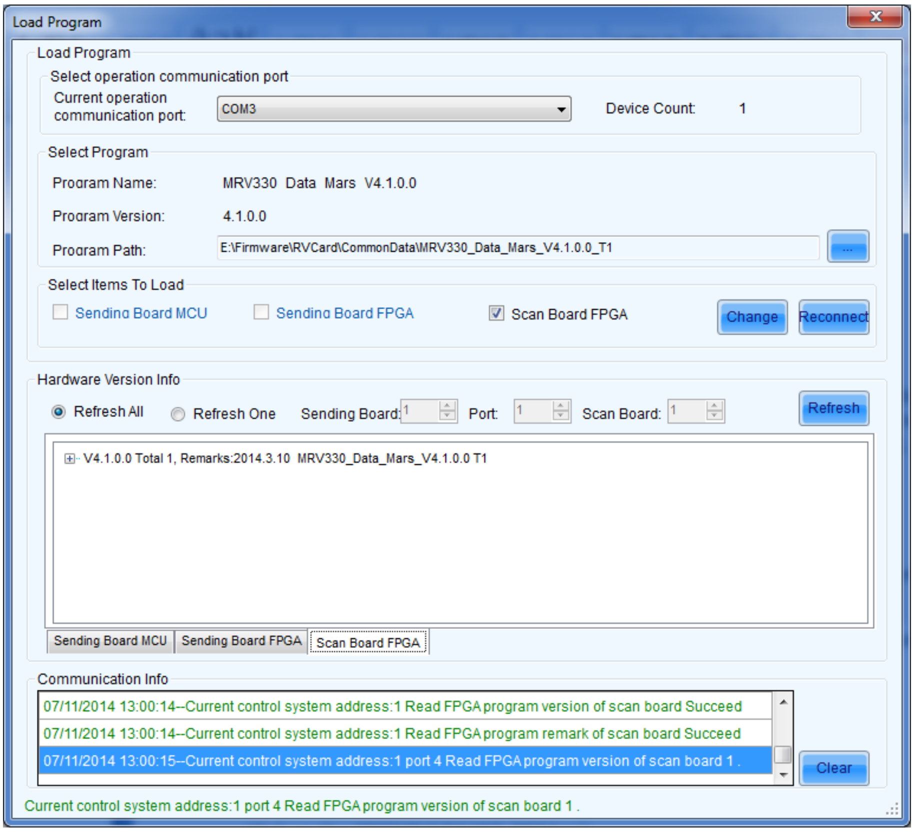

Figure 150 - Firmware Version Checking

Firmware Conclusion

Providing that all preparations are undertaken as described in the setup section of this manual, the Firmware burning / upgrade procedure should be relatively straight forward.

So long as power / data interruptions are avoided during the burn process, the procedure is reliable and repeatable.

New Firmware releases generally provide improved functionality or performance improvements.

Please check with digiLED technical support for a list of additional features and functions available with every Firmware Upgrade.

Thanks for reading !

Appendix

The Maths Behind 655360

The maximum available DVI or HDMI resolutions that a digiLED Navigator-NV can support are generally reported as 1920X1200.

In addition, the non 16:9 resolutions 2048X1152 and 2560X960 can be used.

On the output side of the Navigator-NV however it is not possible to squeeze all of these enormous pixel counts down a single Cat6 (or short Cat5e) cable.

In the real-world, each Cat6 port is limited to 1Gbit/second.

Down this 1 Gig 'pipe' you have to squeeze 5 bandwidth items if you want to control a section of LED screen:

- The Frame Rate
- The Red Bit Depth
- The Green Bit Depth
- The Blue Bit Depth
- The Total Pixel Count

Expressed as an equation:

$$\boldsymbol{If} \quad Total\ Pixel\ Count * Frame\ Rate * (Red\ bit\ depth + Green\ bit\ depth + Blue\ bit\ depth) > 1{,}000{,}000{,}000$$

then the system is operating beyond the capabilities of Gigabit Ethernet cable.

To manage these factors:

DVI video is normally 8bit. It's very unusual to change this.

The most common DVI frame rate is 60Hz (although higher and lower is possible)

The only logical conclusion then is that the number of pixels within the pixel area must be capped to remain under the 1,000,000,000 bandwidth ceiling.

The formula to calculate the maximum pixel count on a Cat6 cable (m*pc*) is therefore

$$\mathrm{m}pc = \frac{1000000000}{60 * (8 + 8 + 8)}$$

$$=$$

$$mpc = \frac{1000000000}{1440}$$

$$=$$

$$mpc = 694444.4444444444444444444444444$$

Sadly, it's impossible to use the full 694444.4444444444444444444444444 pixel capacity of Gigabit Cat6 cable therefore a lower 'useable' cap must be applied.

With LED processing, this upper cap is taken as

$$1280 * 512 = 655360$$

(where 1280 and 512 are both common values found in 'standard' VESA DVI resolutions)

Frame Rate or Bit Depth Changes

From the above formula it can be seen that changes to either the Frame Rate or the Bit Depth of the video signal will later the maximum Pixel Count that can be driven on 1 Cat6 cable.

For example, if the frame rate drops to 50Hz, the Pixel Count rises to 833333.3333333333333333333333333 Pixels.

Again, it is impractical to use 100% of the available Gigabit capacity of the Cat6 so in this example it is best to cap your Pixel Count at 768000 Pixels.

If Medical Grade HDMI signals were used at 75Hz frame rate and 12bit greyscale, the Pixel Count would drop to 370370.3703703703703703703703704 Pixels.

This would realistically be capped at 344000 Pixels.

As above, all these values are based on the formula:

$$\text{mpc} = \frac{Gigabit\ Capacity}{Frame\ Rate * (bit\ depth + bit\ depth + bit\ depth)}$$

Screen Pixel Mapping with Nova Mars - A Quick Example

This subject is covered in detail in the digiLED Manual "Nova Mars LCT Software". As a quick overview however, the following is a step-by-step guide on how to pixel map a small HRi screen.

In this example, a 6 x 4 HRi 3900 screen is pixel mapped with the following Cat5 daisy-chain pattern:

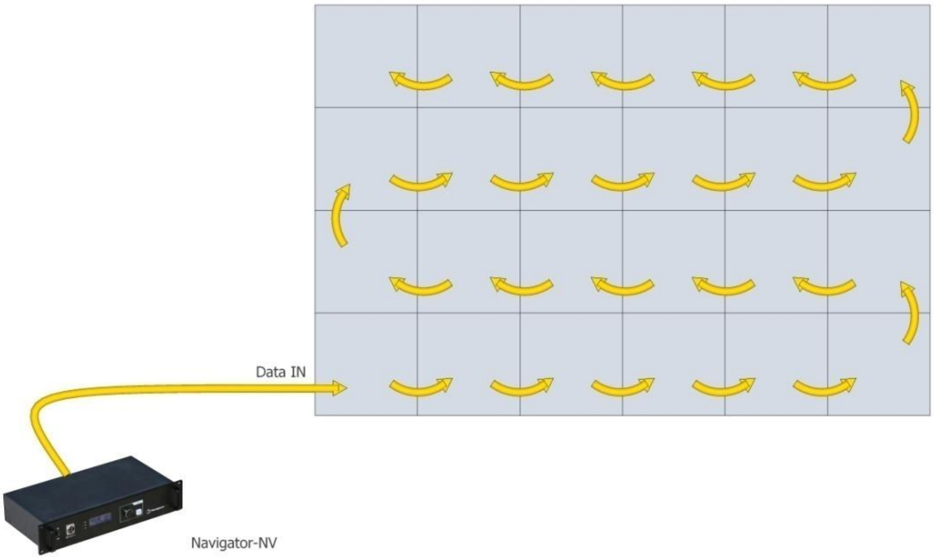

Figure 151 - Front View of a 6 x 4 HRi Screen Data Daisy-Chain

The software "Nova Mars" needs to be programmed to match the above configuration of LED panels.

Starting with the main window of the software:

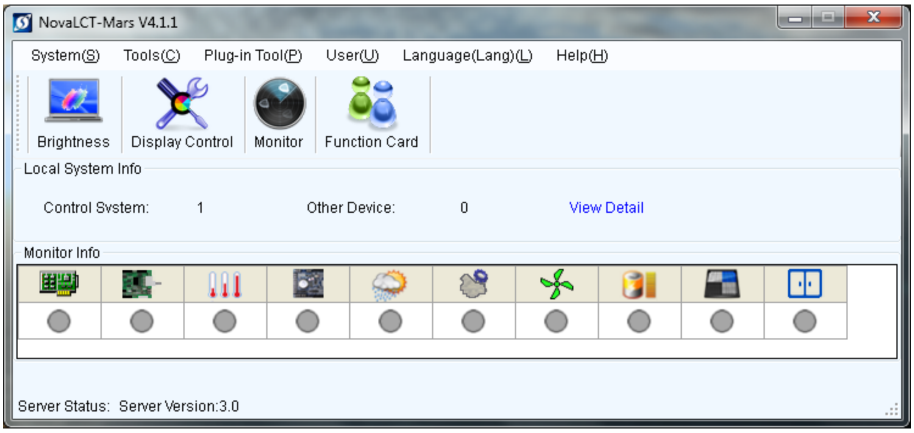

Figure 152 - The Main Window of Nova Mars LCT

First click on the USER menu and enter the advanced login with the password **admin**

The main window will now enter Advanced User Mode and display additional icons.

Now click on the left most icon in the top bar: SCREEN CONFIG.

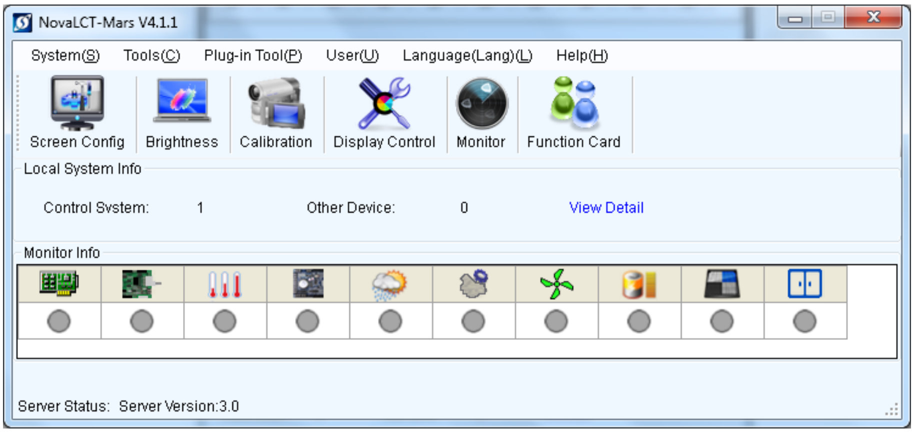

Figure 153 - Nova LCT Mars Front Window

Click NEXT on the following window:

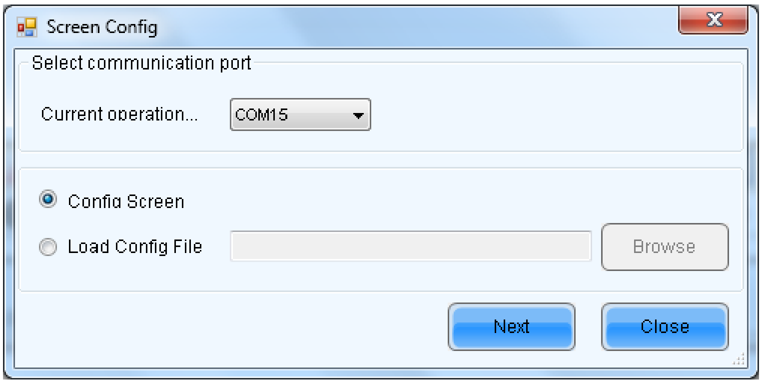

Figure 154 - Screen Config Next Window

The Advanced Screen Setup window will now be displayed:

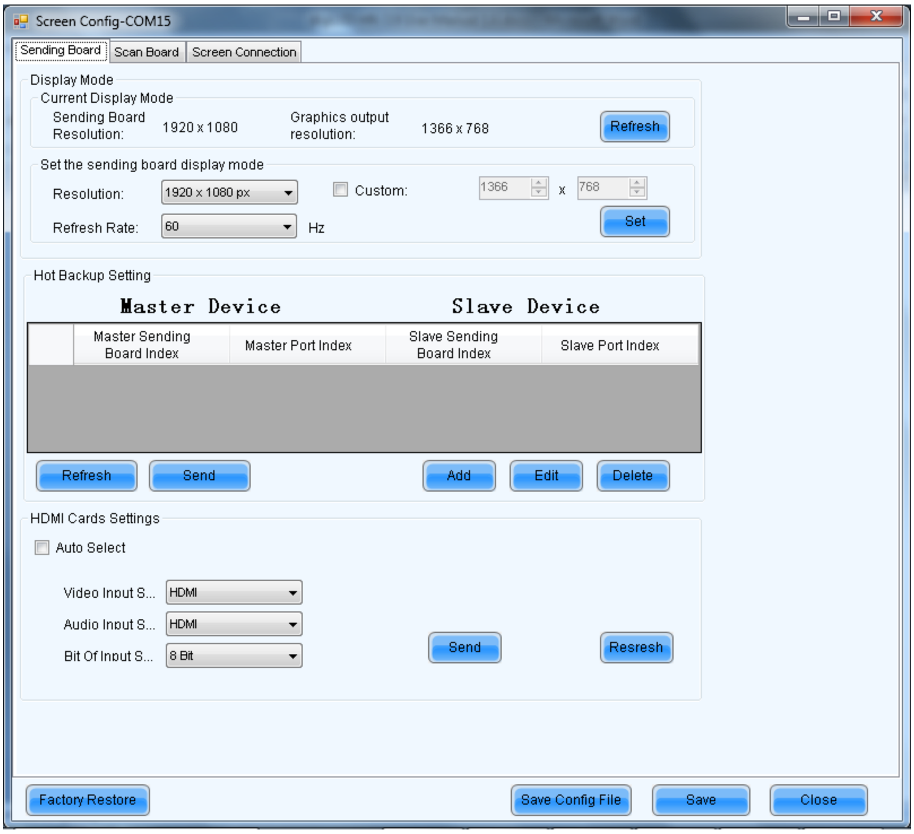

Figure 155 - Advanced Screen Setup Window

Next, click on the tab labelled SCAN BOARD. The following window will be displayed:

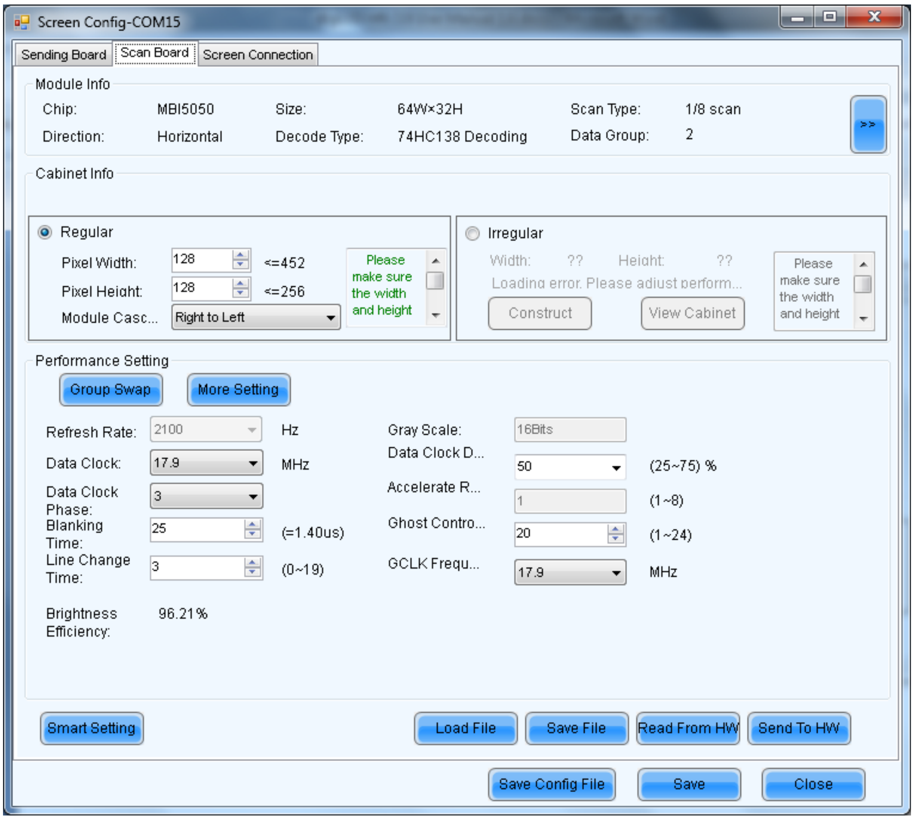

Figure 156 The Scan Board Window

Click LOAD FILE to open the correct rcfg file for the panel type.

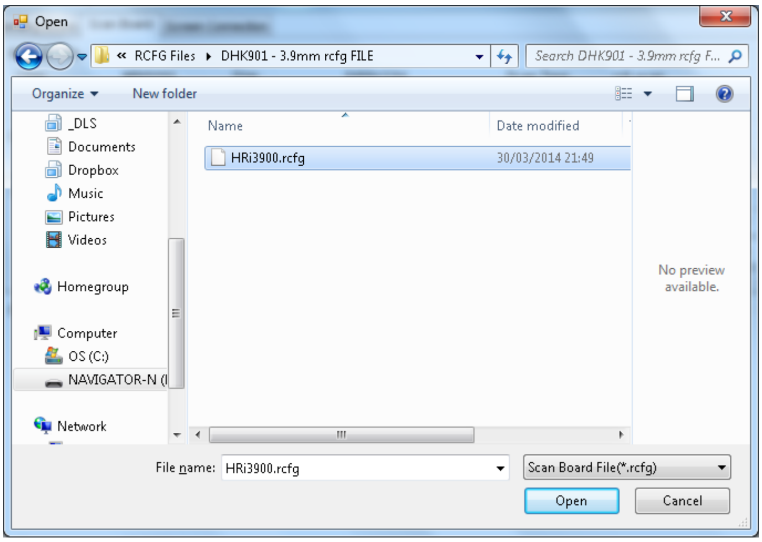

Figure 157 - Load .rcfg File Window

Open the correct file and return to the SCAN BOARD window.

Now click SEND TO HW.

The following dialogue window will open:

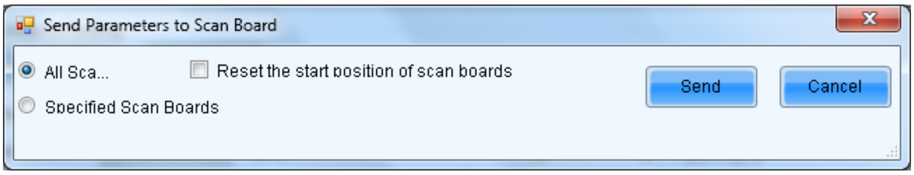

Figure 158 - Send Parameters to Scan Board Window

displayLED recommends that the tick box labelled RESET THE START POSITION OF SCAN BOARDS is ticked. This provides clear visual feedback on the LED screen that all panels have correctly loaded the .rcfg file.

Click the SEND button to apply the rcfg file to all the panels.

Once the sending of data completes, click the next tab at the top, the SCREEN CONNECTION tab. The following window will be displayed:

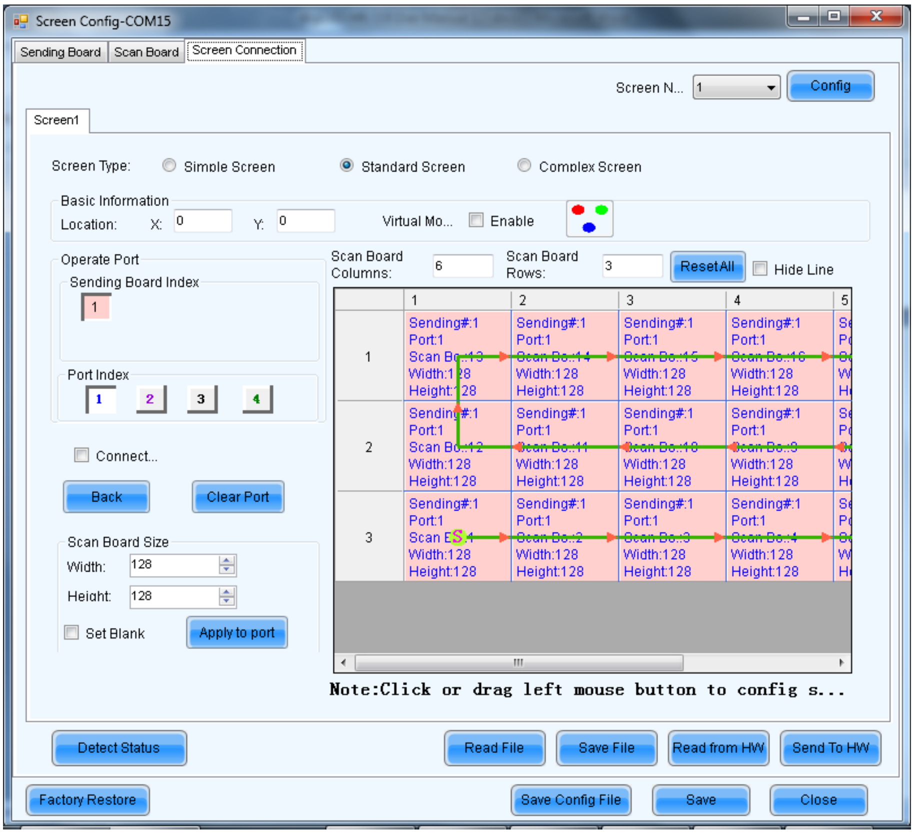

Figure 159 - The Screen Connection Window

In the boxes labelled SCAN BOARD COLUMNS and SCAN BOARD ROWS enter values of 6 and 4. This will tell the software that it is programming a 6 x 4 panel screen. If programming other sizes of screen, change these values (the smallest possible value being 1 x 1).

Now click RESET ALL to clear any history of the previous screen programmed.

An empty grid of 6 x 4 panels with no connection data contained is now displayed:

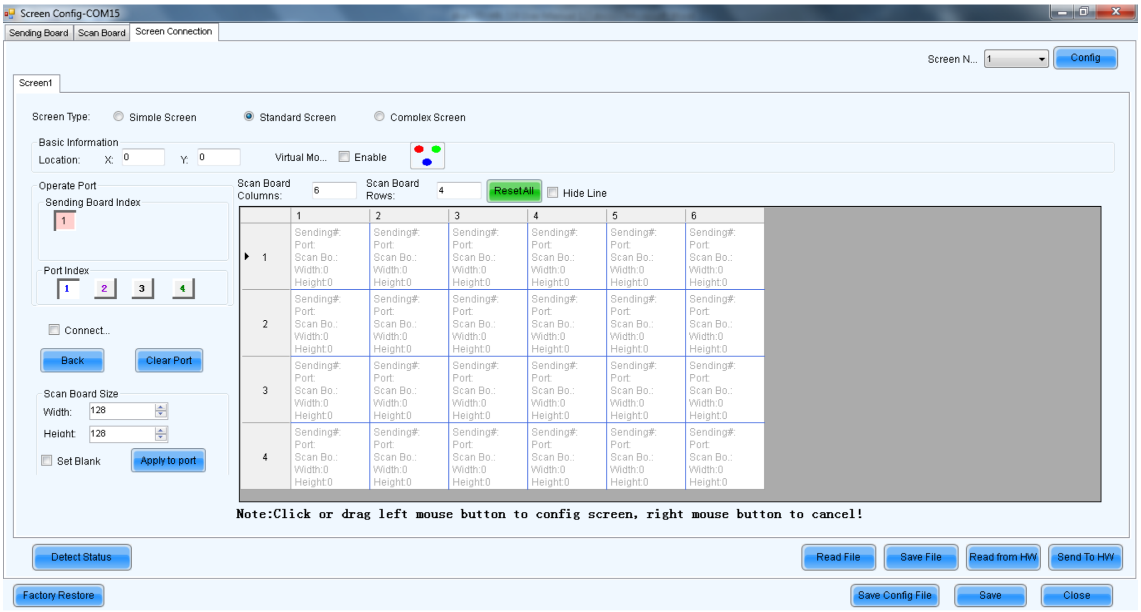

Figure 160 - an Empty 6 x 4 Screen Connection Grid

Now check on the LH side of the window that the SCAN BOARD SIZE setting is correct. For HRi 3900 panels this should be Width = 128 & Height = 128.

Just beneath these settings click the button marked APPLY TO PORT.

It is now necessary to program the Screen Connection Grid with the same cable plan that was used to cable the screen at the start of this example.

Please note - Both views are illustrated as the view from the FRONT of the screen.

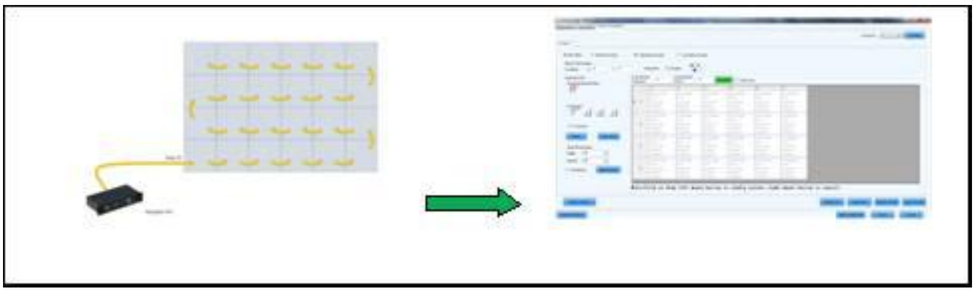

Figure 161 - Applying the Screen Data Connection to the Software

Click the bottom left most cell of the grid to start. This tallies with the real-world cable plan where the Navigator-NV is connected to the bottom left panel.

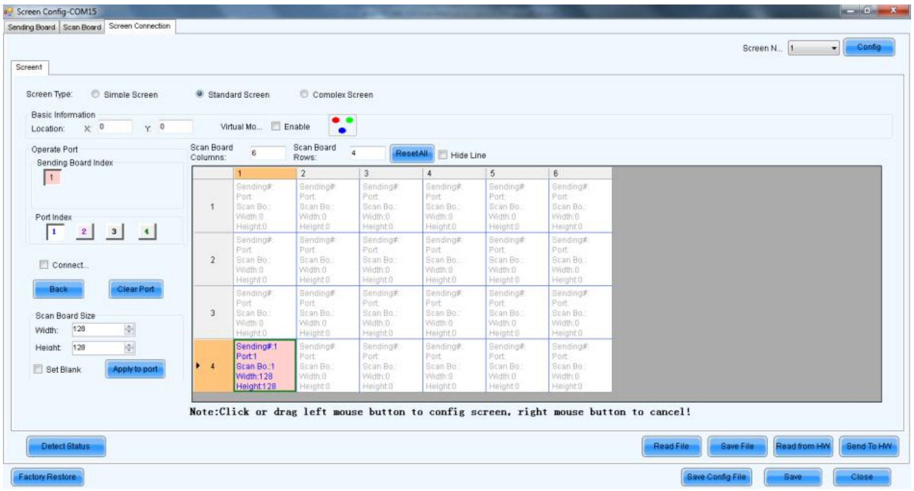

Figure 162 - Single Click on the Very First Panel

Now follow the route of the real-world cable plan on the screen with corresponding mouse clicks in the grid.

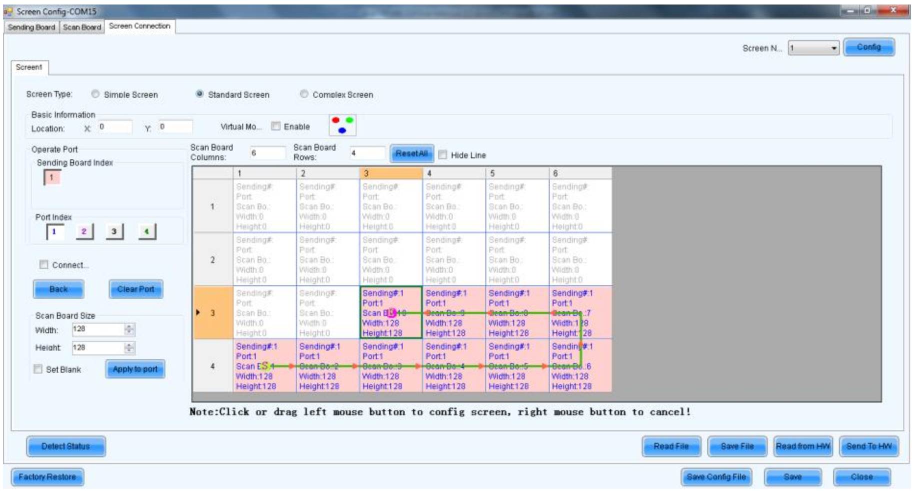

Figure 163 - Clicking through the grid in the same order as the real-world cable jumps

Once every one of the 24 panels has been clicked, the panel at the end of the green data-line shown on the screen should be the top left panel. The green data-line illustration will end with a dot and an E illustrated on that panel as shown below:

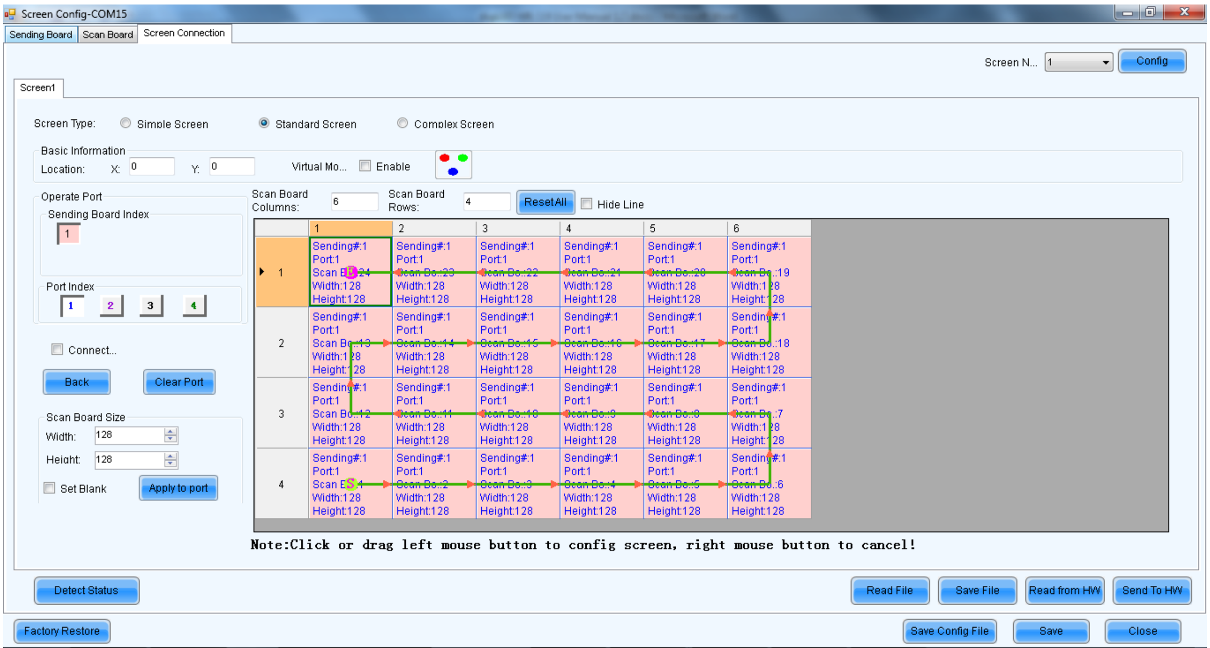

Figure 164 - All 24 Cells Clicked

To transmit the programmed data to the screen panels, click the SEND TO HW button at the bottom right of the window.

A progress timer will be displayed while the data is transmitted:

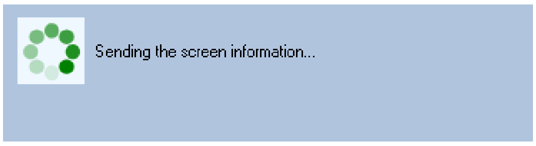

Figure 165 - The Progress Timer During Programming

The process will finish with a confirmation window:

Figure 166 - Programming Success Confirmation Window

The very last stage of the process is to make the screen programming permanent. This is necessary since in its current state, the programming would be lost in the event of a power failure.

To make the programming permanent, click SAVE.

Once completed, the SCREEN CONNECTION window can be closed by clicking the CLOSE button.

This completes the programming process for the example 6 x 4 HRi 3900 screen.

Multiple Mars Versions installed on 1 PC

With a moderate knowledge of Windows and its file structure it is possible to iinstall multiple versions of Nova Mars on one PC without the need to unistall the previous.

This is done by copying the relevant folders within the c:\Program Files(86) folder to a new location.

By default, Nova Mars installs in the folder c:\Program Files(86)\Nova Star\NovaLCT-Mars.

To prevent a new installation of Mars from overwriting these files, make a copy of the folder "NovaLCT-Mars" (including all sub-folders and files) and place it one level higher in the file structure. i.e.

C:\Program Files(86)\NovaLCT-Mars

digiLED suggests the folder is then renamed with the relevant version number added to the folder name. i.e.

C:\Program Files(86)\NovaLCT-Mars_4.2.6

Once this process is completed, any new version of mars can then be installed on the PC via the usual self-installing .exe file process.

The new installation will be placed in c:\Program Files(86)\Nova Star\ whilst leaving the newly renamed folder just created untouched.

To run the newly iinstalled Mars version, just click the icon in the Windows Start Menu.

To run one of the older, previously installed versions, navigate to the newly renamed folder created by the above process and locate the file " NovaLCT-Mars.exe" in the "bin" folders.

i.e.

c:\Program Files(86)\NovaLCT-Mars_4.2.6\bin\NovaLCT-Mars.exe

Please Note - while this method works well on Windows XP and Windows 7 machines with limited User Account Control, it may well prove unreliable on Windows 8 and Windows 10 machines with overzealous protection systems activated.

Glossary

Cabinet	See Panel (used in calibration terminology)
Fly / Flown	A method of building rental screens where the screen is suspended and forces in the panels are tension forces.
EDID	Extended Display Identification Data. The data that is shared between a DVI source and Navigator-NV to exchange information about resolution and refresh frequencies that can be used.
Hubcard	The daughter board that mounts on a Scancard
Spinecard	Similar to the Hubcard but normally fixed into the spine of an LED panel. Carries power and data between Scancard and LED tiles.
LH	Left Hand
L.E.D.	Light Emitting Diode. The semiconductor device on the surface of the screen that produces Red, Green or Blue light.
Louvres	The black plastic grid that clips around the LEDs on the surface of the LED tile. Used to increase "blackness" of LED tile surface when LEDs are not illuminated.
Module	See Panel (digiLED Terminology) . Caution - Chinese documents often call an LED Tile a 'module' . This is never the case in digiLED documentation though.
Panel	The 500mm x 500mm screen component containing 4 LED tiles, 1 Scancard and 1 PSU
Pixel	Abbreviation of Picture Element. The single point of light from combined Red, Green and Blue LEDs which, when displayed in a regular grid creates the video image.
Path	The location within the Windows file structure where a file is located.
PSU	Power Supply Unit - A device to convert high voltage AC power to low voltage DC power for use inside electronic equipment.
RCD	Residual Current Device - A trip or breaker that disconnects an electrical circuit when an earth fault condition is detected.
RH	Right Hand
R.M.A.	Returned Materials Authorisation
Scalar	A general purpose video processor that can take in multiple standards of video signal and change their size and position to fit on an LED screen.
Scanboard	See Scancard
Scancard	The data receiver card housed inside 1 LED panel.
Sender	The LED processing device that converts and distributes HDMI or DVI video signals to the LED screen
SSD	Solid State Drive. A Computer memory drive that has no moving parts.
Shaders	See Louvres
Tile	The 250mm x 250mm sub assembly of the panel that supports the LED pixel on the face of the screen.

WEEE	Waste Electrical and Electronic Equipment Directive. A new European legal requirement covering the end of life treatment for all electronic goods.
X Axis	When viewing the front of a screen, X Axis refers to a movement or line from left to right (or right to left)
Y Axis	When viewing the front of a screen, Y Axis refers to a movement or line from top to bottom (or bottom to top)
Z Axis	When viewing the front of a screen, Z Axis refers to the axis where Tiles / Panels become more recessed or proud than the neighbouring screen surface i.e. perpendicular to the screen surface.