BROMPTON
TECHNOLOGY®

Tessera Processor
User Manual
For M2, T1 and S4 processors

Software Version: v1.4

Contents

Chapter 1 - Introduction

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About This Manual

This manual provides all the information required for the correct and safe use of the Tessera processors and the supplied software.

This revision of the manual was written for Tessera software version: **v1.4** published on: **21 December 2017**

About the Tessera System

The Tessera system comprises processors, receiving cards and software. These elements can be used with a wide range of LED fixtures including panels, battens and mesh. Brompton Technology welcomes all owners and manufacturers who wish to use Brompton processing to control their LED video products.

For more information on becoming a Brompton partner please contact info@bromptontech.com.

Handling and Safe Operation

The Tessera M2 processor is packaged in a rugged custom-designed 2U 19" rackmounting case with integral mounting handles.

Despite the strength of this case the processor should at all times be adequately supported in a rack. The weight of the processor should never be supported entirely on the rack ears as this can lead to distortion especially if the rack is roughly handled.

There are no user serviceable parts inside the unit and opening it will expose the user to potentially dangerous voltages. The unit should never be operated with the cover exposed. Opening the unit will invalidate the warranty.

The product is designed to operate from a grounded power source between 100 and 250V AC, 47 -63Hz . Care should be taken to make sure this is a stable power source and if surges are possible a wise precaution may be to place the unit on an uninterruptible power supply (UPS).

Chapter 2 - General Overview

General

Brompton Technology make three Tessera LED video processors for different applications: M2, T1 and S4.

The M2 is the flagship in the Tessera range of processors. It can control a nominal 2 million pixels over four Gigabit outputs and can accept incoming signals in a wide variety of formats up to and including 3G-SDI and up to 1080p60.

The T1 has the front-side processing, scaling, rotation and DMX control of the M2 processor but with a single Gigabit output and can control a nominal 0.5 million pixels.

Meanwhile, the S4 processor does not have the front-side processing, scaling, rotation of the T1 and the M2, but can control the same number of pixels across four Gigabit outputs as the M2.

System Overview

The M2 processor can receive video input signals on any one of up to 3 ports:

- SDI A
- SDI B
- DVI-I/ Analog

The T1 and S4 processors only support DVI-D.

These inputs are dealt with in more detail in "Input Properties" on page 64.

The Tessera processors can be controlled either via a mouse and keyboard or via a Mac or PC running the Tessera Remote software and connected via Gigabit Ethernet. The processors have an integral DisplayPort (DP++) output port for local control and monitoring, and connects to fixtures via up to four Gigabit Ethernet outputs (supplied on etherCON™ connectors). Each Gigabit output can be distributed via standard Gigabit Ethernet peripherals such as switches and fibre optic transceivers.

System setup diagram

DVI-D
VGA
Y Pb Pr

3G-SDI

Video
Inputs

Remote
Control

Local
Control

Real-time
Control

DMX-512

Ethernet-based
Panel Data

Ethernet Switch

LED Panels
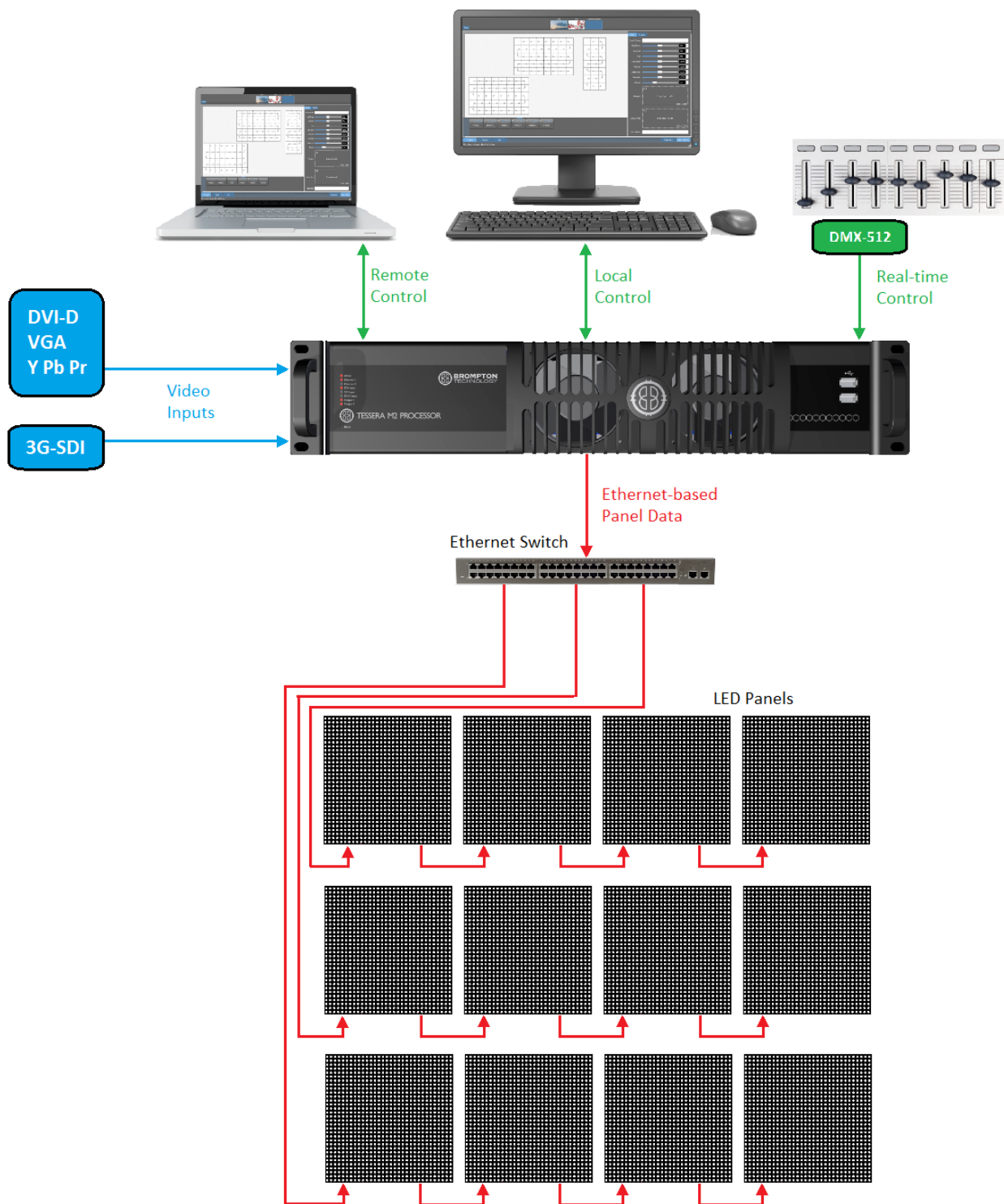
Figure 2-1. Typical system set-up

M2

Front Panel

A	Front Panel Status LEDs
B	2 x USB2.0 type A ports, which allow for the connection of USB memory storage devices, peripherals such as keyboard or mouse or other USB devices

Front Panel Status LEDs

LED Name	Indication
Active	Is lit whilst Local User Interface or Tessera Remote in use
Ethernet	When blinking indicates that the processor is detecting a network connection.
DMX In	A DMX signal is being received by the processor
Video In	The processor is connected to a valid video input source.
Reference In	The processor has a valid source of genlock connected to the reference input connector.
Tessera Out	The processor is connected to panels.
Black/Freeze	Either the blackout or freeze button has been enabled.
Overtemp	Off: temperature normal
	Blinking: processor overheating but operational
	On: processor overheated and shutdown

Rear Panel Connections
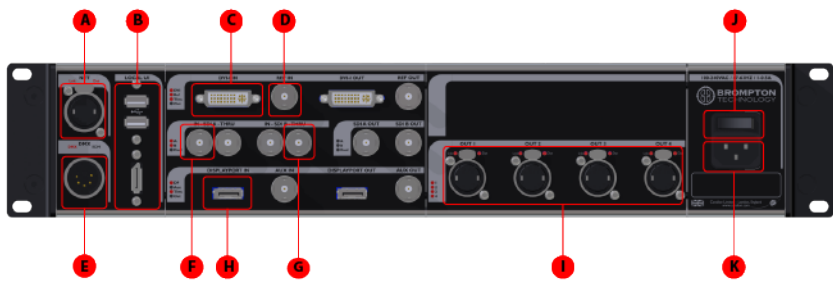
Figure 2-2. M2 processor
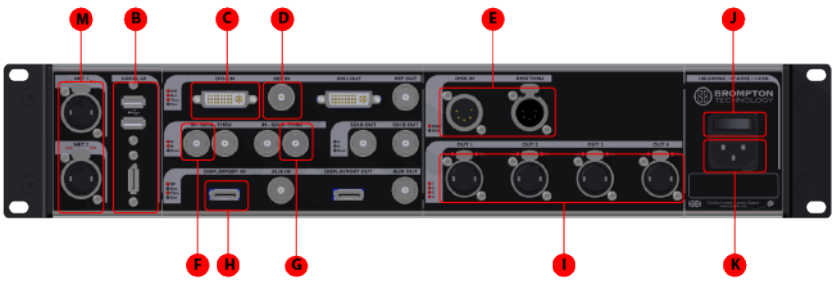
Figure 2-3. M2B processor

A

Remote Control

Connect a PC or Mac running the Tessera Remote or Tessera Control application, or an eDMX protocol directly to the local data Gigabit Ethernet port.

B

Local User Interface

The M2 Processor can be operated locally with a monitor connected via DisplayPort. Peripherals such as mouse and keyboard can be connected to the USB ports on either the front or rear panel.

C

DVI Input

A DVI input of up to 1920x1080 @ 60Hz (148.5MHz pixel clock) is available. This is a DVI-I input which supports DVI-D, VGA/ RGBHV and Component Analog (YPbPr) with a suitable adapter.

D

Reference Input

Used for analog bi-level or tri-level sync.

E

DMX 512-A Input

For DMX real-time control.

F

3G-SDI Input

Two 3G-SDI inputs are available. Both inputs can be used concurrently. The SDI inputs support up to 3G-SDI level A or level B. Both inputs can be used together to support Dual Link HD-SDI.

G

Loop Thru Ports

All video inputs and syncs have re-clocked loop thru ports.

H

DisplayPort Input

Not currently implemented.

I

Gigabit Ethernet Outputs

The M2 processor has four Ethernet outputs which are provided on EtherCON connectors. Fixtures should be connected with gigabit Ethernet cable (Cat-5e or above). For more information on Ethernet connection see "Connecting Fixtures" on page 25.

J

On/Off Switch

The processor can be turned off from the power switch. It can be shutdown from the local interface or remote computer. No harm will result from turning the processor off at the switch.

K

IEC Mains Input

The input is auto ranging from 100-250v/47-63Hz

L

DMX512-A Input and Thru

For DMX real-time control

Remote Control Ports

M

The M2B has two Gigabit Ethernet ports for Remote Control. These act like a switch and can be used for daisy-chaining in to other Tessera processors.

S4

Front Panel

A	Front panel status LEDs
B	Black Button: sends the output of the processor to black
C	Freeze button: freezes the output of the processor
D	2 x USB 2.0 type A ports, for the connection of USB memory storage devices, peripherals such as a keyboard or mouse or other USB peripherals

Front Panel Status LEDs

LED Name	Indication
Active	Blinks whilst Local User Interface or Tessera Remote application in use
Ethernet	Processor is connected to Tessera Remote. When blinking indicates that the processor is detecting a network connection.
Video In	The processor is connected to a valid video input source.
Tessera Out	The processor is connected to panels.
Overtemp	Off: Temperature normal Blinking: processor overheating but operational On: processor overheated but shutdown

Rear Panel
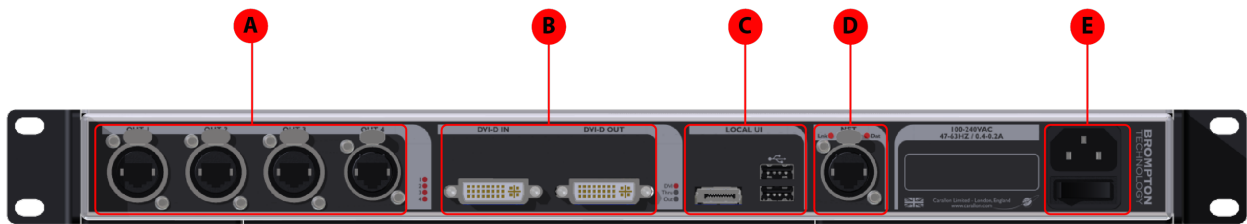
|	
A	Gigabit Ethernet Outputs The S4 processor has four Ethernet outputs which are provided on EtherCON connectors. Fixtures should be connected with gigabit Ethernet cable (Cat-5e or above). For more information on Ethernet connection see Connecting Fixtures on page 1.
B	**DVI-D Input** A DVI-D input of up to 1920x1080 is available, with a reclocked DVI-D thru
C	**Local User Interface** The M2 Processor can be operated locally with a monitor connected via DisplayPort. Peripherals such as mouse and keyboard can be connected to the USB ports on either the front or rear panel
D	**Remote Control Ports** The S4 has a Gigabit Ethernet port for remote control with Tessera Remote software only.
E	**IEC Mains Input and On/Off Switch** The S4 processor supports a voltage range of 100V-240V, and a mains frequency range of 50 - 60Hz. The processor can be turned off from the power switch. It can be shutdown from the local interface or remote computer. No harm will result from turning the processor off at the switch.

T1

Front Panel

A	Front panel status LEDs
B	2 x USB 2.0 type A ports, for the connection of USB memory storage devices, peripherals such as a keyboard board or a mouse or other USB peripherals

Front Panel Status LEDs

LED Name	Indication
Active	Blinks whilst Local User Interface or Remote Control in use
Ethernet	Processor is connected to Tessera Remote. When blinking indicates that the processor is detecting a network connection.
DMX In	A DMX source is connected to the processor.
Video In	The processor is connected to a valid video input source.
Tessera Out	The processor is connected to panels.
Black/Freeze	Either the blackout or freeze button has been enabled.
Overtemp	Off: temperature normal Blinking: processor overheating but operational On: processor overheated and shutdown

Chapter 3 - Quick Start Guide

To get a basic system up and running, just follow these steps. This guide covers starting a new project with fixtures connected. To set up a project offline and connect fixtures at a later stage, see "Tessera Remote and Offline Editor" on page 30. Further information on all the features contained in this Quick Start Guide can be found in the relevant sections of the manual.

Setting up your system
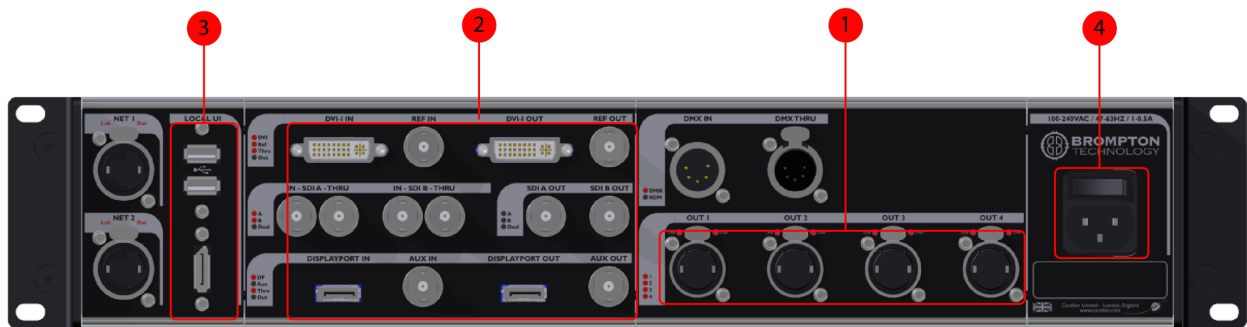
Figure 3-1. The Rear Panel

1. Connect your fixtures to the Ethernet output ports, using Gigabit Ethernet cable (Cat 5e or above) and network switches, if necessary, using Ethernet connection rules.

2. Connect your video input source(s) to the DVI and/or SDI input ports.

3. Connect a monitor to the Local UI DisplayPort connector. If you are using DVI, HDMI or VGA with the monitor then you will need to use the relevant DisplayPort adaptor. Connect a keyboard and mouse to the USB ports. Alternatively, you can access the processor's user interface through a Mac or Windows PC running the Tessera Remote application.

4. Connect the IEC mains input and switch the processor on. When the processor has powered up, the monitor will display the Start Screen. The processor may be configured to auto-load a previous project, which it will do after a set amount of time, by default 10s, if the user does not invervene. If a previous project auto-loads it is necessary to close the project to return to the Start Screen.
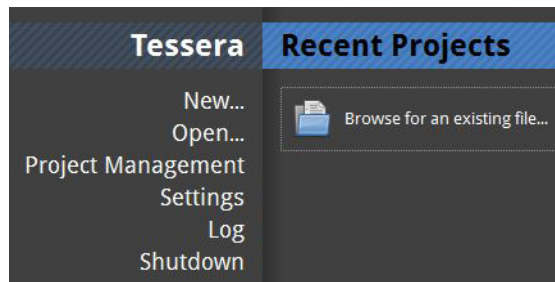
Figure 3-2. The Start Screen

Setting up your project

5. From the Start Screen, select **New…** The New Project Wizard will launch.

Figure 3-3. The New Project Wizard

6. Type in a name for your project. If you are using Tessera Remote in offline mode, you can also select the location in which it is to be saved (if you are accessing the processor directly, the project will be saved to its internal storage).

7. Select the fixture type from the dropdown menu and uncheck the **Create an array of panels** box. If you are using more than one fixture type, click the **Go To Advanced View** button. Select the fixtures required. You can hold CTRL whilst selecting to select multiple fixtures.

8. Click **Create**. You will now be taken to the Main Project Screen.
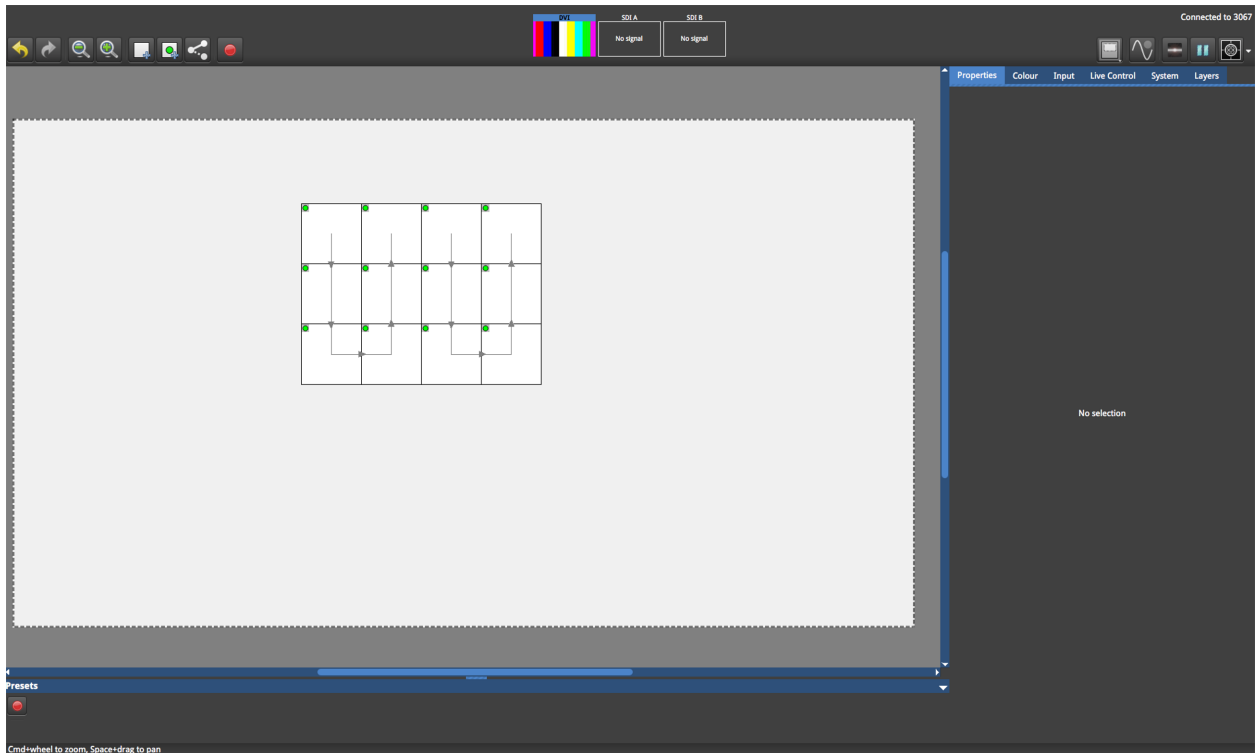
Figure 3-4. Main Project Screen

Connecting your fixtures
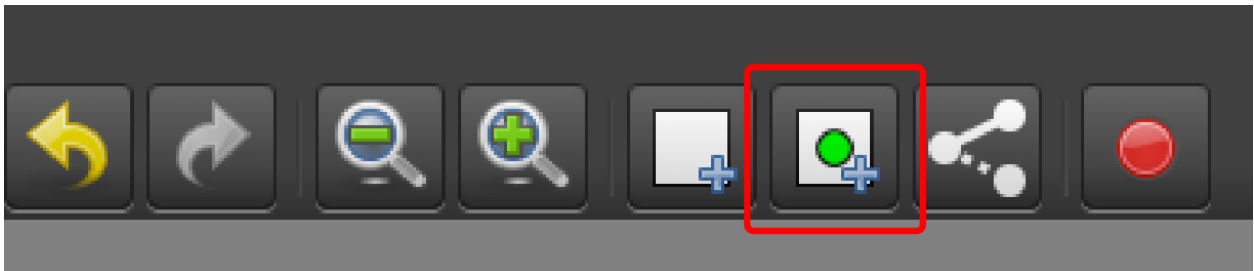
Figure 3-5. Add fixture from network button

Click the Add Fixtures From Network button. The Add Fixtures From Network toolbar will be displayed.
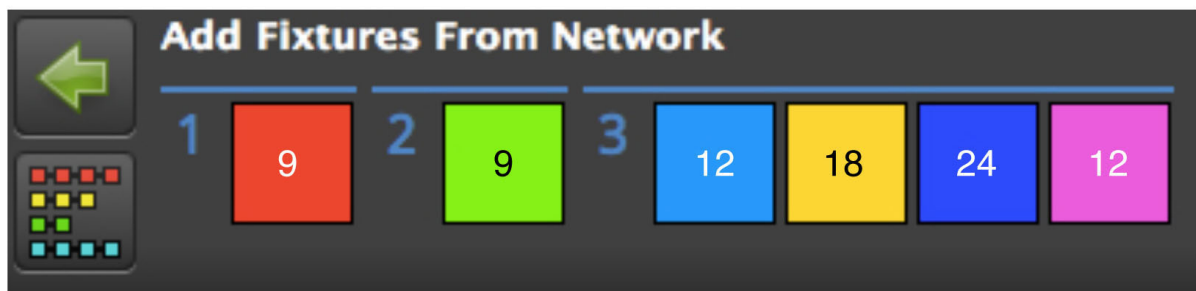
Figure 3-6. The Add Fixtures From Network toolbar.

1. The processor will show any attached strings of fixtures and the number of fixtures on each string. In the picture above, the processor can see fixtures connected to outputs 1, 2 and 3. Outputs 1 and 2 have a single string of 9 fixtures on each output, whilst Output 3 has 4 strings with 12, 18, 24, and 12 fixtures.

2. Click on the string of fixtures you wish to add. The first fixture in the string will be highlighted white, while the other fixtures will display varying shades of the same colour to denote the the order of the fixtures in the string from dimmest to brightest.

3. Click on the canvas to add the first fixture in the string, then add subsequent fixtures in the string using the same method.

4. Repeat the process for all strings, then click the green Back arrow to return to the Main Project Screen. The connected fixtures will start to output video and the fixtures on the canvas will display a green circle to indicate they are online.

- 23 -
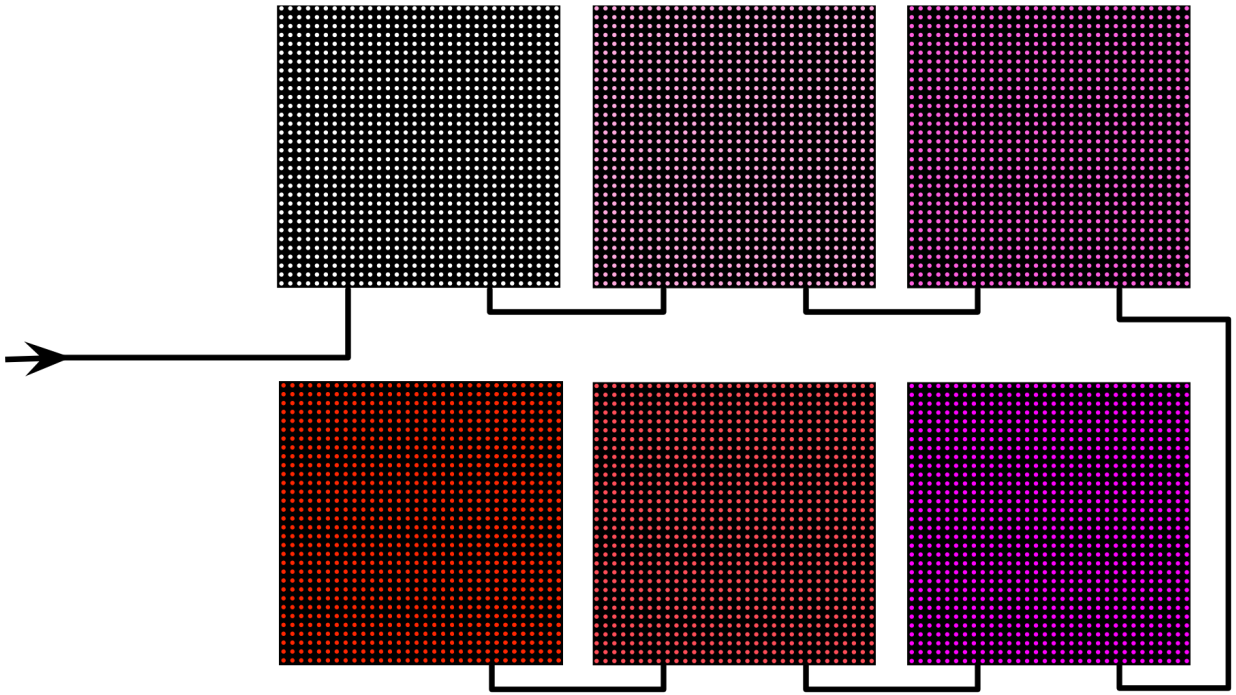
Figure 3-7. A highlighted Recoloured string

Chapter 4 - Connecting Fixtures

Tessera processors can drive any Tessera compatible LED panel, mesh or batten system. Most panel products will have a receiver card fitted inside each cabinet or tile. In the case of ray or batten type products where there is a low pixel count per fixture, the panel controller card may be housed in a buffer box and a number of fixtures connected to each buffer.

All Tessera compatible LED fixtures have two Gigabit Ethernet ports: one to allow connection from the processor and one to connect to the next unit in the chain. These ports can be used interchangeably.

The processor communicates with LED fixtures on the network using the Tessera protocol, which is transmitted via cabling that conforms to Cat 5e or above (this includes Neutrik etherCON terminations).

The topology of a Tessera system is very simple. The fixtures just need to be connected to the processor either directly or via a Gigabit Ethernet network switch. Once connected, a group of fixtures in a daisy-chain becomes a string.

> **Note -** The Tessera Protocol only supports Gigabit Ethernet compliant equipment. It will not work at all with 100BASE-T (Fast Ethernet) or 10BASE-T

Connection Guidelines

Cat 5e or better cable must be used to connect between processors and fixtures. The maximum supported individual cable length is 100m. The Tessera protocol can be transmitted over standard Gigabit Ethernet compliant fibre optic hardware for single runs exceeding this distance.

The suggested maximum number of nodes between the processor and the furthest fixture in any system is 5 switches and 50 fixtures (fibre optic transceivers would also count as switches). By using switches up to 500 fixtures can be run from a single processor output port (assuming this does not exceed the pixel limit of the output).

Redundant Cabling

Redundant cabling is supported on Tessera M2 and S4 processors, where two outputs can be configured to operate as a redundant pair. Redundancy is not supported on Tessera T1 processors as they only feature a single output. The first output acts as the primary port, while the second output acts as the backup. A cabling loop can now be created from the primary port, through a string of panels, and then back to the processor. In the case of signal loss or errors with the primary feed, the panels will automatically switch to the backup feed, thus ensuring that video continues to be displayed despite a cable failure anywhere within the loop.
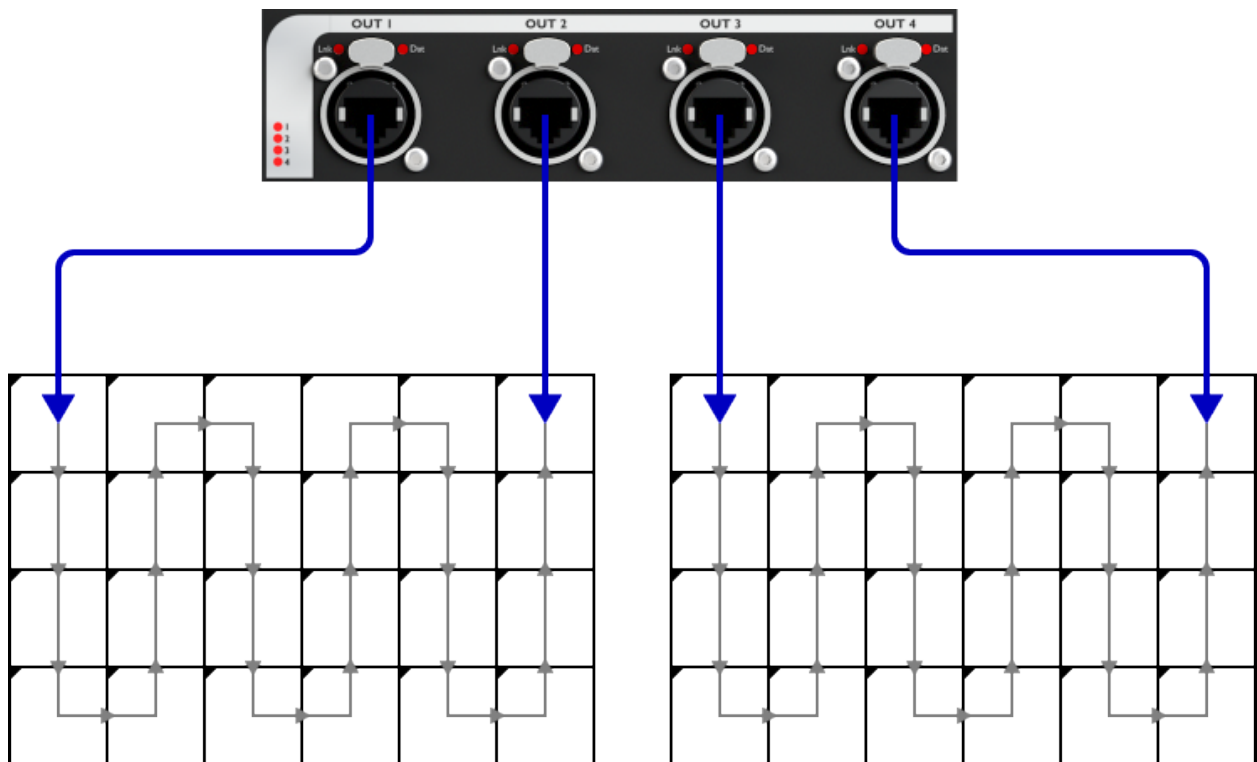
*Figure 4-1. Two redundant pairs of outputs from an processor to
two chains of panels.*

Redundancy can be independently enabled for each pair of output ports by enabling the tick-box on the System tab. Once enabled, the processor will indicate 'Loop OK' if the two ports are correctly cabled together in a loop with no breaks.
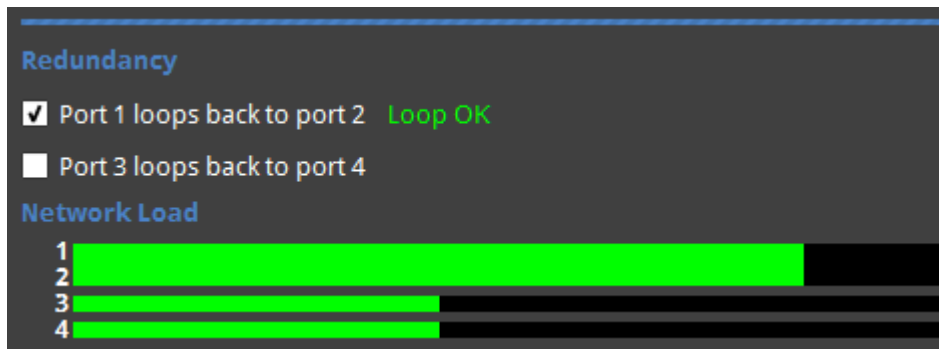
Figure 4-2. Redundancy options on the System tab, including the loop status indicator and a double-height load bar for a redundant output pair on ports 1 and 2. Ports 3 and 4 continue to operate independently without redundancy.

When operating in redundant mode:

- The processor and all panels must be running firmware V1.4.0 or later.

- Panels must be cabled in a single chain of up to 50 panels, with each end of the chain connected back to the processor. Ethernet switches must not be used to 'split' the signal. Other Ethernet hardware (such as fibre extenders) is supported as normal.

- Redundancy should be enabled on the processor before cabling up panels in a loop.

- The same capacity limits (described in "Output Capacity" on the next page) that normally apply to a single port will apply to the pair of ports. This effectively halves the overall processor capacity, as each output signal is being 'doubled up'.

- The processor load bars for the two ports will combine into a single bar indicating the load for that pair.

- Switching between redundant mode and normal mode will temporarily black-out the video signal for all connected panels on all ports, so should not typically be performed 'live'.

- The active feed (primary or backup) currently used by each panel can be viewed in the Online Panels screen.

- If both the primary and backup signals are operational, each panel may choose to use either signal. If a panel receives a video error on the currently active port, it will switch to the other port for the next frame. In the case of complete signal loss on one port, the panel will switch to the other port within a few frames.

- Each loop must be cabled between the two adjacent ports on the same processor. (I.e. Port 1 to Port 2, and Port 3 to Port 4.)

Output Capacity

The capacity of a Tessera output port depends primarily on the network bit depth and the genlocked frame rate. The nominal pixel capacity is outlined in the table below:

Refresh/ Bit Depth	8 bit	10 bit	12 bit
24 Hz	1,312,500	1,050,000	875,000
25 Hz	1,260,000	1,008,000	840,000
30 Hz	1,050,000	840,000	700,000
50Hz	630,000	504,000	420,000
60Hz	525,000	420,000	350,000

Other factors affecting output capacity

Fixture rotation

Rotating fixtures on-axis (i.e. by 0°, 90°, 180° or 270°) has no affect on the output capacity. However each fixture rotated off-axis is counted twice towards the output capacity.

Mapping mode for projects with multiple fixtures

When using 1:1 mapping, the output capacity is not affected.

When using interpolated mapping, the content on fixtures with a coarser pixel pitch is scaled so that the content appears the same size across all fixtures. In this mode, all fixtures are assumed to have the same pixel pitch as the finest fixture, and the output capacity is calculated according to the physical dimensions of the fixture.

For example, suppose we have a project with three fixture types:

- **Type A:** 5mm pitch, 500mm x 500mm physical size, 100 x 100 = 10000 pixels
- **Type B:** 7.8mm pitch, 500mm x 500mm physical size, 64 x 64 = 4096 pixels
- **Type C:** 15.6mm pitch, 1000mm x 500mm physical size, 64 x 32 = 2048 pixels
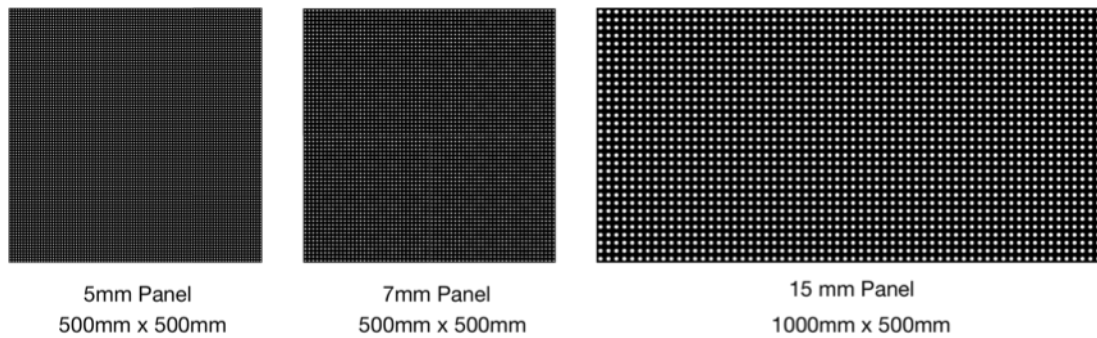
Figure 4-3. Different pixel pitch fixtures

Fixture type **A** will count 10000 pixels towards the capacity regardless of whether interpolated mapping is used, because it has the finest pixel pitch.

With 1:1 mapping, each fixture of type **B** would count 4096 pixels towards the capacity limit, but with interpolated mapping it counts the same as a type **A** fixture of the same size, so 10000 pixels. Fixture type **C** is the physical size of two type **A** fixtures, so counts 20000 pixels towards the limit.

Very small fixtures

Very small fixtures - those with either dimension smaller than 16 pixels - have a high processing overhead. Therefore the number of these fixtures supported may be fewer than that calculated from the nominal pixel capacity.

Estimating fixture capacity

When associating fixtures to a project, network load bars are provided to show the load on each output port. These update in real time as settings such as network bit depth, genlock frame rate and fixture rotation are updated. See "Network Load" on page 104.

To help with estimating the number of processors required for a project, we have created a simple web-based calculator tool which models all of the factors outlined above. For further details please contact support.

Chapter 5 - Tessera Management Software

The Tessera Management Software is used to configure and control all aspects of Tessera Processors. The user interface can be accessed in three ways - the local user interface, the Tessera Remote application and the Tessera Offline Editor.

The user interface is consistent across all three access methods, with only subtle differences in functionality, which will be outlined in the relevant sections of the manual.

Local User Interface

When using the local user interface the software runs on the processor itself, so no external computer is required. This is the simplest way of using a Tessera Processor.

To view the user interface, connect a monitor to the Local UI port on the rear of the processor. This supports DisplayPort monitors, or DVI/HDMI monitors via a suitable adapter. The minimum supported resolution is 1280x1024 and the maximum resolution is 1920x1080.

The user interface is controlled by connecting a keyboard and mouse to the USB ports on the front or rear of the processor.

Tessera Remote and Offline Editor

Tessera Remote is a free Windows PC and Mac OS application that allows remote control of Tessera processors across a network. Additionally the Remote application can be used as an 'offline editor', allowing the set up and editing of Tessera projects when away from a physical processor.

Tessera Remote is downloadable from the Brompton Technology website: http://bromptontech.com/support#downloads

Note - Tessera Remote Application software versions and the processor firmware versions must match. If the processor firmware version and Tessera Remote Application do not match then you will not be able to connect remotely to the processor.

Installation for Mac OS X

1. Download the application. It is packaged in a .dmg file. By default this should download to the Download folder.

2. Double click on the .dmg file. This opens up the Tessera Remote .dmg package

3. Drag the Tessera Remote icon into the Applications Folder, or copy (⌘ – C) and Paste (⌘ – V) the Tessera Remote icon into Applications folder

4. You can have multiple software versions of the Tessera Remote Application on the same Mac computer. You may find it helpful to store these in different folders within the Applications folder.

Installation for Windows PC

1. Download the application. It is packaged as a self-extracting .exe file.

2. Double click on the self-extracting .exe file's icon.

3. This opens the Setup Wizard. Hit **Next** to continue.
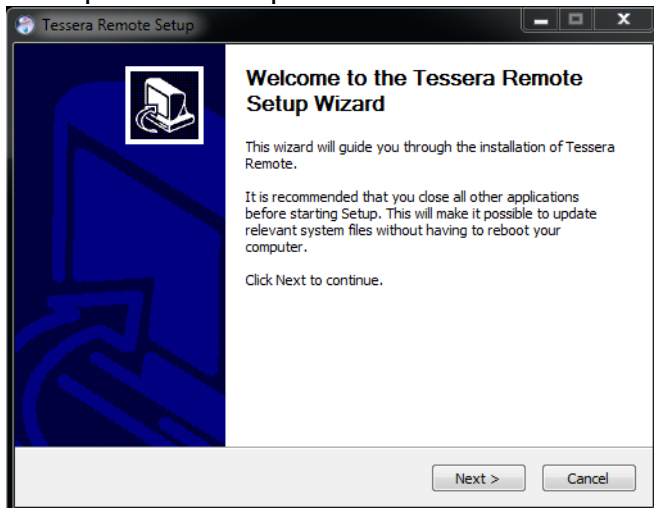
4. The setup wizard will then ask you for a location.
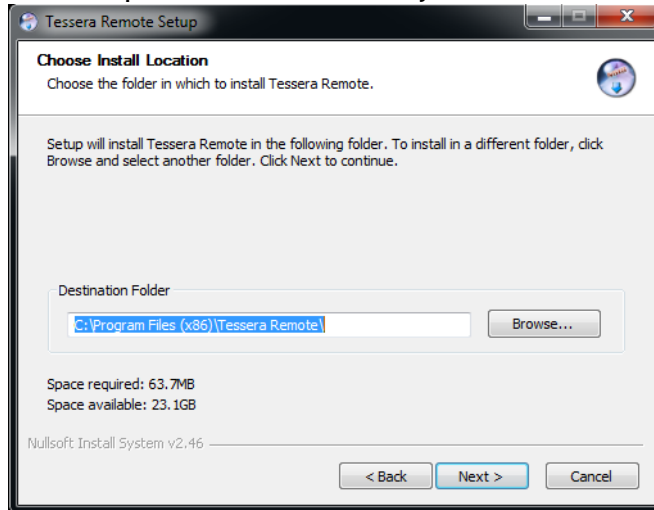
5. When the application has finished installing then you should see the completion dialog box. Click **Finish** to finish the installation process.
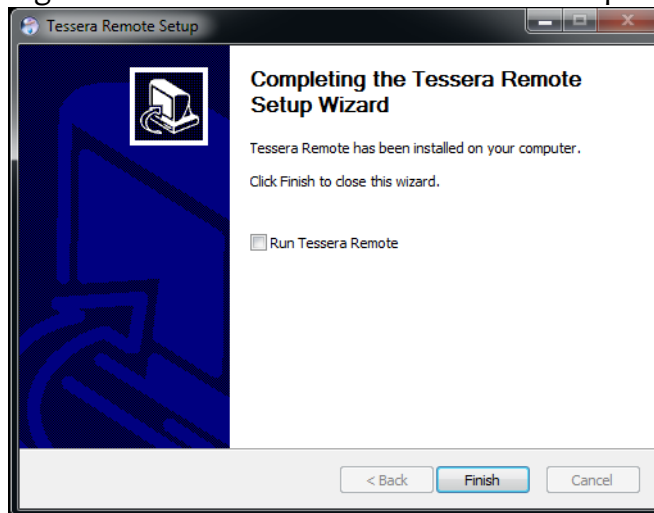
Network settings for Remote Management

To connect to a Tessera processor you must connect your Mac or Windows PC to a Tessera processor's remote network interface via an Ethernet network. As the Tessera processor's remote network port supports Auto MDI-X, this network can be as simple as single piece of Cat 5e cable connected between the Mac or Windows PC and the processor without the need for a switch. The Remote Application can connect to a processor over a WLAN, but features like thumbnail previews and video previews will work at a reduced frame rate, depending on the quality of the signal propagation and the WLAN bandwidth. Connecting across a WLAN is not recommended when connecting to multiple processors.

The default IP settings for the processor are 192.168.0.50, with a subnet mask of 255.255.255.0.

For further details on setting IP addresses on Windows and Mac OS, see "Setting IP Addresses" on page 143

Connecting to a Tessera Processor

Having physically connected the processor to an Ethernet network with a Tessera processor on, launch the Tessera Remote application. This will open a dialogue box that allows the user to select whether to start the Remote Application in Remote mode or in Offline Editor mode.

Clicking the Start Tessera Remote window will start the application in Remote mode.

The application will automatically attempt to detect processors on the Remote network. Note the software version at the bottom of the screen.

Discovered processors show the user-defined name of the processor, the processor serial number, the firmware version, the IP address and the name of the project file on the processor.

To connect to the processor, either double click on the desired processor, or click on a processor to select it and click on 'Connect to xxxxx', where xxxxx is the serial number of the selected processor.

If the version of Tessera Remote and the processor firmware are not the same, then you may update the processor firmware to match the version of Tessera Remote you are using across the network directly from Tessera Remote. To do this select the processor on which you wish to reload the firmware, and click **Reload Processor Firmware**.

NB only when the upload has completed and the has been validated will the processor store the firmware into the internal Flash memory.

Tessera Remote Settings

The Settings Preferences are to allow customisation of canvas and selection settings within Tessera Remote that are stored locally, which are different to those of the processor itself.

Once connected to the processor, the Remote application functions and looks exactly the same as the Tessera Management software running on the processor itself.

The top right-hand corner of the main canvas screen shows the status of the connection, with the name of the processor and its serial number.

When Tessera Remote is connected to the processor the Local Management app running on the processor cannot be used. You can take control of the processor by clicking on the Take Control icon.

Disconnecting from the processor

If you wish to disconnect from the processor, or quit the application, you will be given the choice of:

- Leaving the project open on the processor and returning control to the processor.
- Closing the project on the processor and returning control to it.
- Shutting down the processor remotely.

Offline Editor

Using Tessera Remote in Offline Editor mode allows projects to be created or edited without the need to have a physical processor.

When you launch Tessera Remote in Offline Editor mode you are presented with the Offline Editor menu that allows you to select a recent project or open a recent project, as well as set canvas settings.

If there are existing projects already saved on your Windows PC or Mac then these will be listed on the Offline Editor Recent Projects Menu. Just double-click to open an existing project.

To transfer a project from Tessera Remote to a processor requires the project to be transferred via a USB flash drive.

When a project created in the Offline Editor is imported to the processor, any fixtures used in the project will need to be associated with 'real world' fixtures. See "Adding Fixtures to a Project" on page 42 for more details.

Multiple Processor Control

There are three approaches to controlling shows with multiple processors.

Use a single Tessera Remote instance - it is easy to connect and disconnect from different processors on a network, and the output from the processors will continue uninterrupted even when Tessera Remote is not connected.

Use multiple Tessera Remote instances - although Tessera Remote only supports connection to one processor at a time, it is possible to run several instances of application on the same computer, allowing remote control of several processors from one computer. See below for more instructions.

Use the Tessera Control application - Tessera Control provides a simple user interface for controlling multiple processors simultaneously. Controls include brightness, colour, test pattern, source selection and preset triggering. See "Configuring the processor for DMX control" on page 93 for more information.

Running multiple instances of Tessera Remote

When controlling multiple processors from one computer it is preferable to use a fixed IP address on each processor and on the computer running Tessera Remote. It can also be helpful to name each processor (see the section on Identification in "Processor Settings" on page 128.

Controlling different processors is then as straightforward as 'tabbing' (Alt – Tab Windows, ⌘ - Tab Mac os) to the relevant instance of Tessera Remote as required.

When running mutiple versions of Tessera Remote on Mac OS it is a good idea to move the application to the Applications folder and rename the application to 'remote'.

To start Tessera Remote so that multiple instances can be run it is necessary to run Terminal in Utilities.

Once you have started Terminal, type:

open /applications/remote.app and hit Enter

To run another instance of Tessera Remote type the following into Terminal:

open -n /applications/remote.app
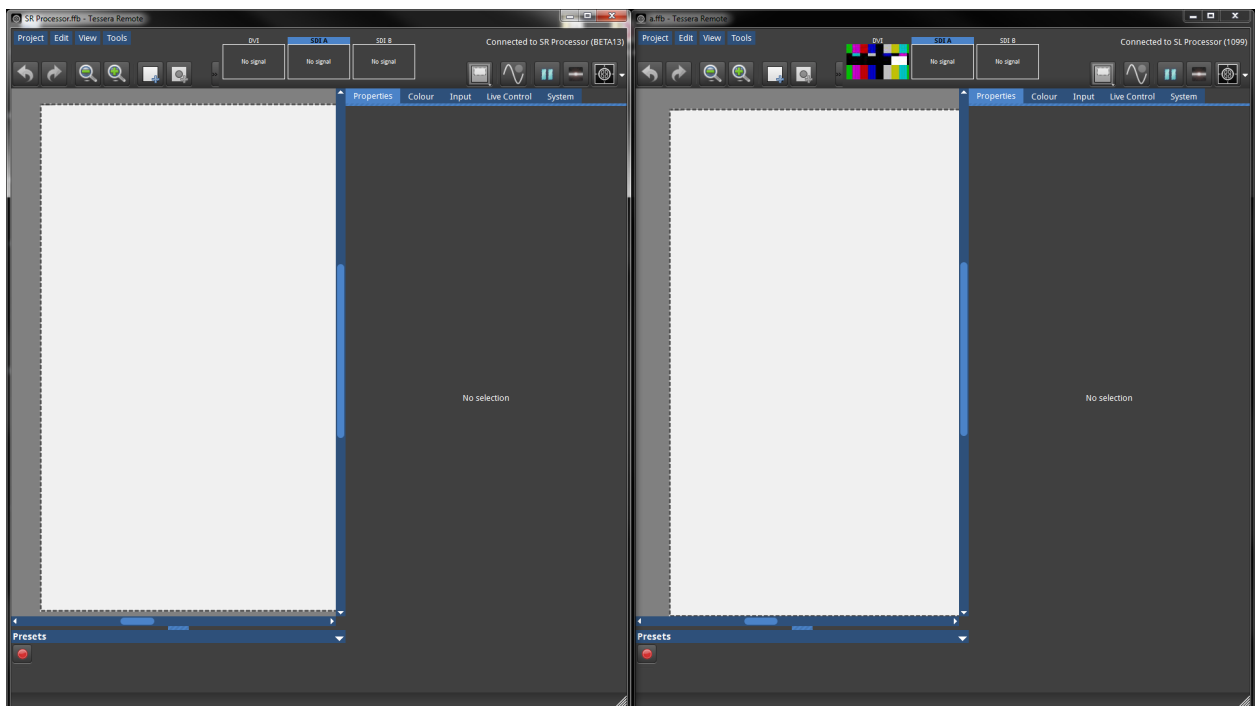
Figure 5-1. Windows PC side by side application instance

Figure 5-2. Alt-Tab allows the user to select the relevant instance.
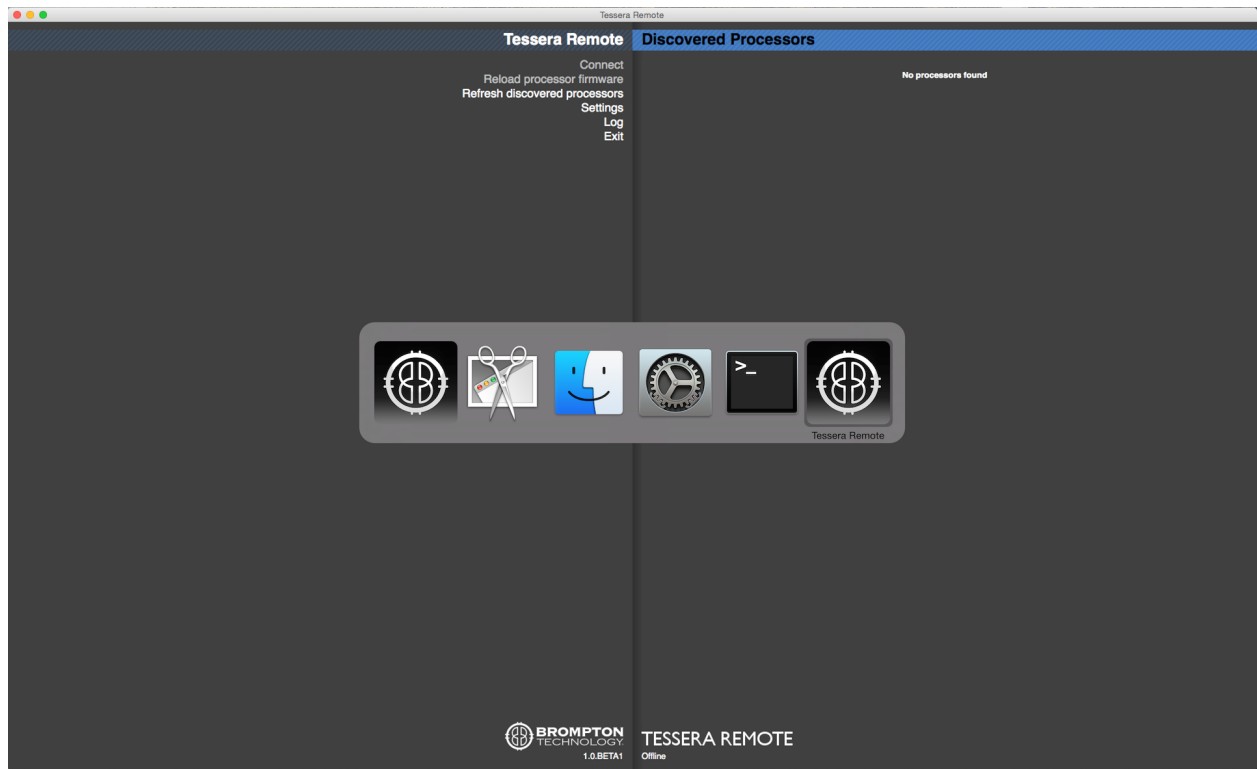
Figure 5-3. In Mac OS ⌘-Tab to select the relevant instance.

Chapter 6 - Project Setup

Creating A New Project

Figure 6-1. The New Project Window

The New Project Wizard is launched each time you start a new project on the processor, Tessera Remote or the Offline Editor.

1. To start a new project, click **New...** in the Start Screen or in the Project menu in the Main Project Screen. This will launch the New Project Wizard.

2. Using the wizard, enter a name for your project.

3. If you are using the Offline Editor in Tessera Remote, you can change the location of where the project is saved. If you are using the processor locally or remotely, the project will be saved to the processor's internal storage. To save the project on to a USB flash drive or an other USB storage device you will need to export it. See "Project Management" on page 41

If you are creating a project with only one fixture type:

1. Select the manufacturer and fixture type from the dropdown menus.

2. Specify the width and height of the array of fixtures to be generated automatically. Alternatively, you may uncheck the **Create an array of fixtures** tickbox and add fixtures manually once the project is created.

3. Select the topology from the dropdown menu or leave this at the default setting if you want to add the topology manually once the project has been created.

4. Click **Create** to complete the new project wizard and open the new project.

If you are creating a project with more than one fixture type:

1. Click **Go to Advanced View** and select the fixture types you require from the list using CTRL+ click. If the required fixture type is not listed, you may import it by clicking **Import Types...** (see below for more information).

2. For 1:1 pixel mapping, check the **Map pixels directly to the canvas (1:1)** tickbox. See "Mapping Options" on page 40

3. The M2 supports a 1920x1080 raster by default, but can also be set to 1080 x 1920, 1600x1200, 2880 x 720 and 720 x 2880 by selecting this from the drop-down menu in **Canvas Size**. Using these alternative resolutions puts the processor in to Low Latency Mode. See "Low Latency Mode" on page 106 for the implications of using this mode

Figure 6-2. Selecting a canvas size from the Advanced View

1. In the advanced mode, you do not have the option of automatically generating an array of fixtures - the fixture types you have selected will be available in the library once the project has been created. Click **Create** to complete the wizard and open the new project.

> **Note -** Once a project file has been created it is not possible to change the included fixture types, mapping method or canvas size. The creation of a new project is required to change these properties.

Importing New Fixture Types

You may find from time to time that it is necessary to import a fixture that is not included in the library. To import a fixture you will need the Fixture Definition File, which is a .xml file.

1. Insert a USB flash drive containing the Fixture Definition File in the processor.
2. Open the New Project Wizard by clicking **New...** and go to the Advanced view.
3. Click **Import Types...**
4. Using the browser, locate the Fixture Definition File on the USB flash drive and import it by clicking **Confirm**.

All imported fixtures are marked with an asterisk in the fixture list in the New Project Wizard.

> **Note -** When importing new fixture types it is important to ensure that they are compatible with the installed version of firmware if not included. Please contact Brompton Technology if you are unsure or experience trouble importing new fixture types to a processor.

Mapping Options

Interpolated Mapping

When multiple fixtures are added, the processor will by default automatically adjust the scaling for each fixture type so that video appears the same physical size on all fixtures, regardless of pixel pitch.

It's worth remembering in this mode when different pixel pitches are scaled to match each other it may not be possible to place as many fixtures in the Canvas as would have been the case without interpolated mapping. If this is an issue it may be desirable to use 1:1 mapping.

Please see "Network Load" on page 104 for the implications on network load of Interpolated Mapping.

1:1 Mapping

In some cases where multiple fixtures are used it may be desirable ignore the physical size of each fixture and instead map video content directly to the LED fixtures. In this mode it is the resolution (i.e the number of LEDs) that determines the size of the fixture on the canvas, not the physical dimensions. This may be because content has already been prepared with the correct scale for each product or to allow more fixtures to be placed in the canvas.

To do this check the box marked "Map pixels directly to the canvas (1:1)" in the advanced view of the New Project Wizard (see "Creating A New Project" on page 37).

Project Management

Opening and Importing Projects

To open a project that is stored on the processor, you simply click **Open...** from the Start Screen menu or File drop-down menu in the Main Project Screen and select the project from the list. If the project you wish to open is not already stored on the processor you will have to import it.
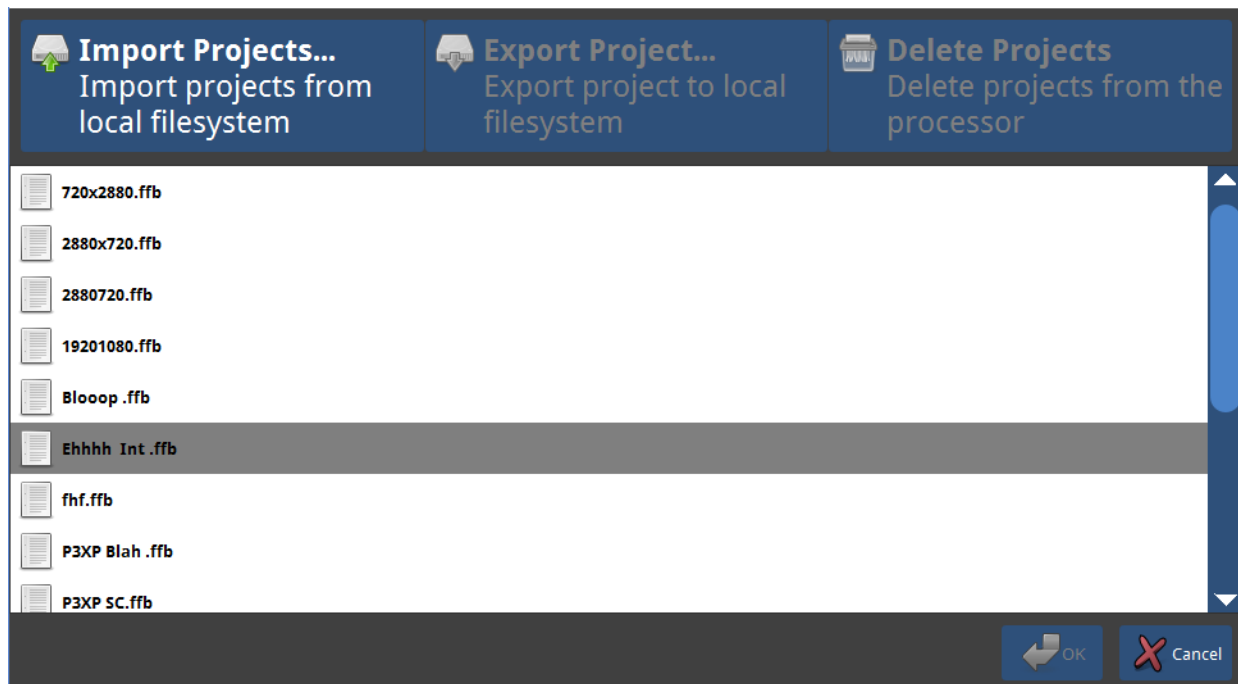
Figure 6-3. Importing projects in the project management window.

To import a project if you are using the processor with a locally connected keyboard, mouse and monitor:

1. Insert the USB flash drive containing the project file into one of the available USB ports on the processor.

2. Click **Open...** on the Start Screen or in the File drop-down menu in the Main Project Screen. This will display the Project Management window.

3. When you have selected the file, click OK. This will copy the project file on to the pro-

cessor and display it in the list of projects stored on the processor.

4. Select the file from this list and click OK to open it.

To import a project if you are connected to the processor via Tessera Remote:

1. Click **Import Project...** in the project management window and navigate to the project file you wish to load, either stored on the remote computer's hard drive or inserted removable media.

2. When you have selected the file, click OK. This will add the project file to the list of projects stored on the processor.

3. Select the file from this file and click OK to open it.

Deleting Projects

1. Click **Open...** on the Start Screen or from File drop-down menu in the Main Project Screen. This will display the Project Management window.

2. Select the project or projects (hold Ctrl to select multiple files).

3. Click **Delete Projects**. The selected files will immediately be removed from the processor.

Adding Fixtures to a Project

There are two main workflows for adding fixtures to a project - *offline* project creation and *on-site* project creation. Users can use whichever workflow is most convenient for their project, including a combination of the two.

In the *offline* workflow, use Tessera Offline Editor to create the project file and to add and lay out fixtures in the project, using the *add-fixtures-from-library* tool. When on-site and the fixtures are physically connected to the processor, it is then simply a case of transferring the project to the processor, and *associating* the real world fixtures with the fixtures in the project, using the *add-fixtures-from-network* tool. This workflow is useful if the fixture layout is complicated, and/or if detailed information about the fixture layout and cabling is available ahead of arriving on site.

In the *on-site* workflow, the project and fixture layout are created on a processor with real fixtures already physically connected. In this case use the *add-fixtures-from-network* tool to take an online fixture and add it to the canvas. This workflow is more useful if the fixture layout is simple or not known ahead of time.

Add fixtures from library

Use this tool if the fixtures are not already physically connected to the processor, or when using Tessera Offline Editor.

Click the toolbar icon, select the desired fixture type, then click on the canvas to add the fixture. The *Rotation* field is provided to rotate fixtures before placing them. Enable the *Join Fixtures* option to have the about-to-be added fixture joined to the previously added fixture. Click the *back* arrow when finished.

To add a rectangular array of fixtures, ensure the *Rotation* is set to 0°, and click and drag to draw out an array of the desired size. The array can be resized by dragging at the edges of the array, or moved by dragging when hovering over the array, when the hand cursor shows. The toolbar shows the available topology options. When finished, click the *tick* button to save the array, the *cross* button to delete it.

Add fixtures from network

Use this tool when the fixtures are already physically connected to the processor, either to associate with fixtures added offline, or to add online fixtures directly to the canvas.

After clicking the Add Fixtures From Network button, the toolbar will show the detected strings of panels, grouped by output port. A string is a continuous daisy-chain of Tessera fixtures, so if a network switch is used to split a signal, each output of the switch will be detected as a separate string. Each string will be coloured in the user interface, and the panels will be illuminated to match. The number in the string icon indicates the number of detected fixtures. An example is shown below.
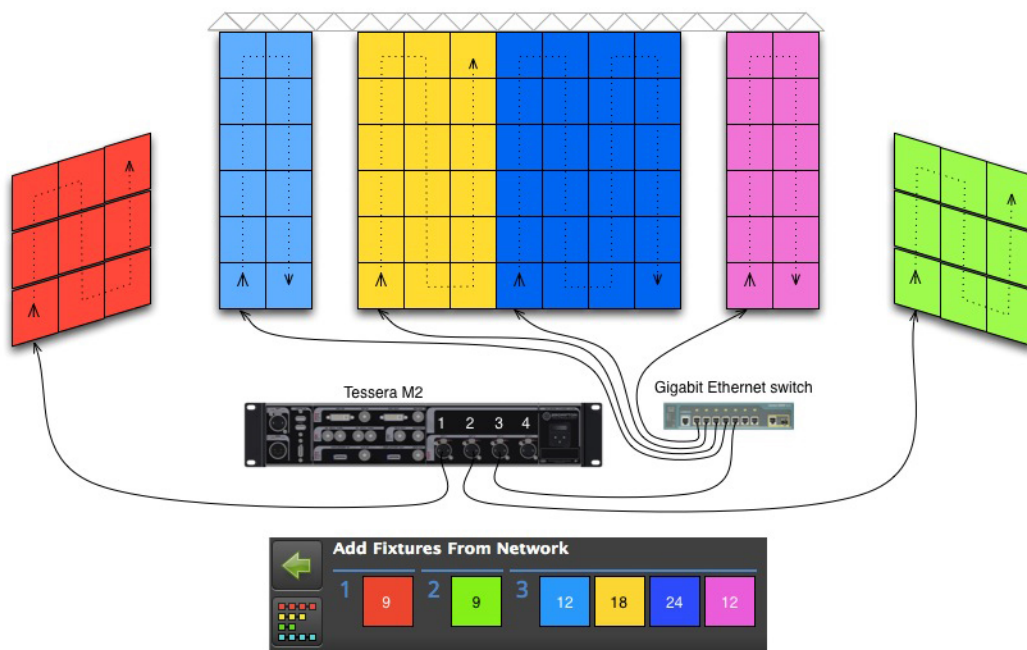
Figure 6-4. An example of a Tessera system topology.

Hovering over a string icon will cause the corresponding fixtures to be highlighted white, for easier identification. Once you have chosen a string, click it to start placing it. You will then be prompted to place each fixture in the string in turn. The fixture currently being placed will be illuminated white.

Adding fixtures directly to the canvas works similarly to adding fixtures from the library. For information on this, refer to the previous section.

To instead associate with a fixture which is already on the canvas, simply select the online fixture then click on the relevant fixture on the canvas. If the fixtures on the canvas already have topology information, you will be prompted to associate the rest of the string automatically, which you can do by pressing enter. If you only wish to associate part of the string, hold the `shift` key and select the last fixture you wish to associate. Alternatively you can continue to associate fixtures individually by clicking on each fixture on the canvas in turn.

It is also possible to associate with fixtures on the canvas which already have a fixture associated. In this case the old fixture will be disassociated before the new fixture is associated.

Sub-Fixtures

For some fixture types, each fixture does not have its own Tessera interface, instead multiple fixtures are connected to a single power supply / control box. These fixtures, for example strips and small tiles, are represented in the Tessera system as *sub-fixtures*. The power / control boxes are called *root nodes*.

Each root node contains a Tessera Receiver Card, and like normal panel-type fixtures is connected to the rest of the system over daisy-chained Gigabit Ethernet. Root nodes connect to sub-fixtures using a proprietary data/power connection.

Sub-fixtures may be individually positioned and rotated on the canvas, just like normal fixtures.

Sub-devices

Conventional LED Panels

LED Strips   'Creative' LED Panels

Sub-device Root Nodes
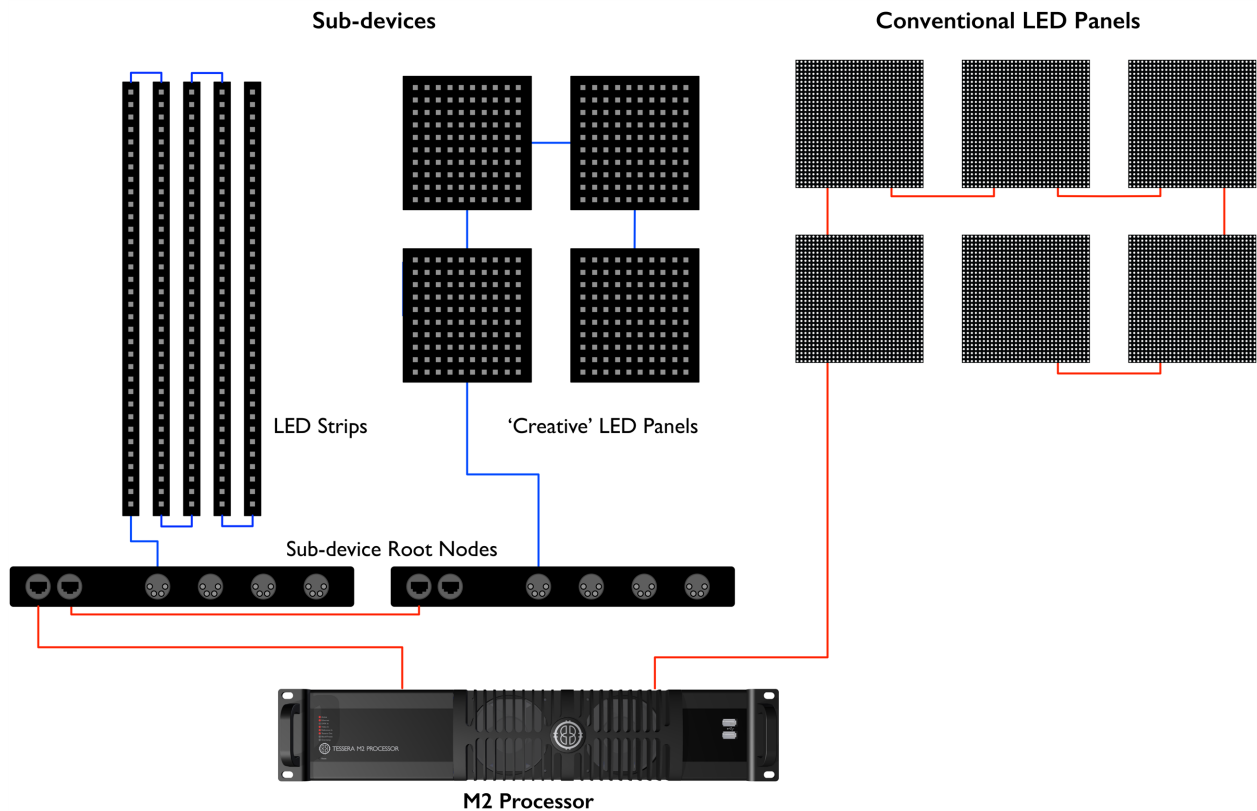
M2 Processor

Figure 6-5. Sub-fixtures being used with conventional LED panels.

Root nodes are not typically able to detect what types and quantities of sub-fixtures are connected to their outputs, and therefore must be told by the processor. This is achieved by adding root nodes to the canvas.

Using the *add-fixtures-from-library* tool, described in "Adding Fixtures to a Project" on page 42 add a root node to the canvas. Pressing the `Tab` key or clicking the *Next Port* button switches to adding sub-fixtures to the first output port of the root node. Repeated presses of `Tab` or the *Next Port* button advances through the ports, before returning to adding root nodes or panels to the Tessera string.

Note that root nodes are limited in terms of the types, quantities and combinations of sub-fixtures that can be connected to their outputs. These constraints will be enforced when adding sub-fixtures to root nodes. See the fixture manufacturer's documentation for more information.

The *edit topology* tool can be used to modify the connections between root nodes and/or sub-fixtures after they have been added, see "Changing Topology" on page 47 for more information.

Once the root node and fixture layout has been completed, and the fixtures have been connected to the processor, the root nodes can be associated. Strings of root nodes appear

the same as strings of normal panels in the *add-fixtures-from-network* tool, described in "Adding Fixtures to a Project" on page 42. When a root node is associated its outputs will automatically be configured with the correct types of sub-fixtures, and the sub-fixtures will automatically be associated. It is not normally necessary to individually associate sub-fixtures.

Sub-fixture test patterns

Test patterns may be enabled on sub-fixtures in the same way as normal fixtures, via the fixture properties pane. Different patterns can be enabled on each sub-fixture, but note that if test patterns are enabled on one sub-fixture, all other sub-fixtures on that root node will cease to display live video.

A small subset of simple solid-colour test patterns can also be enabled on root nodes. All of the root node's output pixels, including those that are not currently configured/associated to sub-fixtures, will be illuminated.

Understanding Topology and Association

Tessera processors are able to detect the topology of connected fixtures, i.e. the order in which fixtures are connected, which port on the processor they are connected to and if fixtures are broken into strings by switches. Topology is used to help users associate online fixtures with fixtures in their project.

Fixtures are identified by a unique MAC address. When a real fixture is associated with a fixture in the project, the MAC address is recorded and this association persists until the user decides to change it.

Topology is only used to assist with association. So if the real-world topology is changed after fixtures are associated, for example because a wall is re-cabled, the association will **not** automatically be changed. If topology errors are turned on, then any changes will be highlighted in red on the canvas.

Swapping Fixtures and Correcting Association

Each fixture connected to a Tessera processor is recognized as a unique fixture. Each unique fixture is associated with a position on the canvas. If a tile goes offline or is removed, the icon of that fixture remains in the canvas but there is now no fixture associated with it. The green dot (showing that the panel is online) will now go white. In instances where a fixture is swapped out from the middle of a string the processor can see that a fixture has disappeared and a new fixture has appeared in the same position. It draws the conclusion that a swap-out has taken place and will offer the user the option to correct association.

To perform the swap-out of one fixture:

1. Disconnect and remove the faulty fixture or controller box.

2. Insert and connect a good fixture into the same position in the string.The processor will prompt with:

Figure 6-6. The correct association dialog box

3. This message will be on screen for 10 seconds. After this time you can find the Correct Association option by right clicking on the icon of the affected fixture or by selecting Correct Association from the Edit menu.

4. Click on the blue **Correct Association** button.

Changing Topology

It is possible to change the topology manually using the Topology toolbar if the drawn topology does not match the actual sequence of fixtures. An example of where this might be useful is a touring production where a screen has been rebuilt at the second venue of the tour with a different cable layout to that used at the first venue. These instructions assume the panels are powered and connected and the mistake has just been noticed.

In our example, at the first venue the panels were cabled in a continuous lace from left to right and from bottom to top as viewed from the front of the screen ("First venue topology." below).
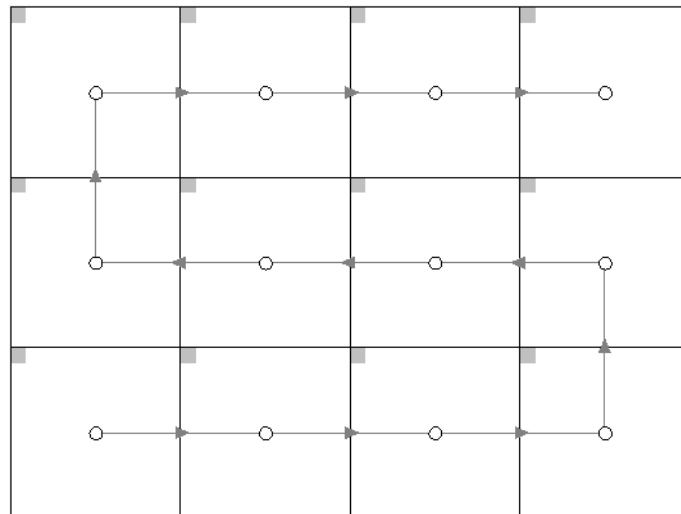
Figure 6-7. First venue topology.

Owing to a mistake during the load in at the second venue the panels are now cabled differently ("Second venue topology." below). It will be too time-consuming to re-cable the screen correctly so another solution must be found
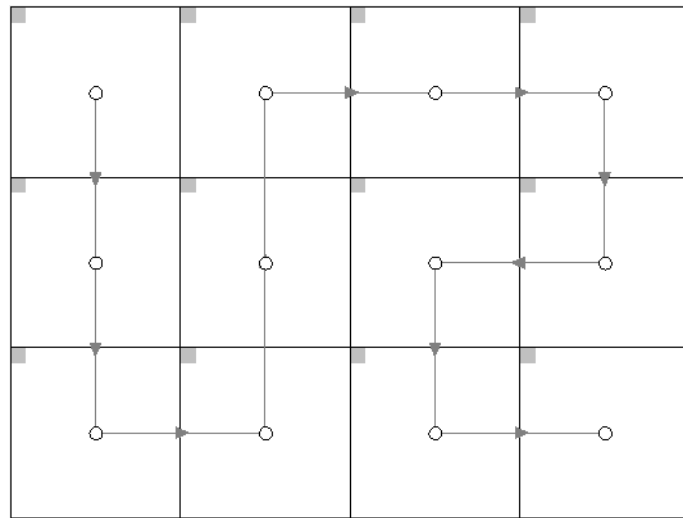
Figure 6-8. Second venue topology.

To correct a screen follow the following steps:

1. On the canvas select all the panels that have the wrong topology. Right click on one of the panels and select **Disassociate**.

2. Now click the Edit Topology button to view the Topology toolbar

    and select the string of fixtures you wish to correct by double clicking on the dot in the centre of one of the panels. The whole string will now be coloured red.
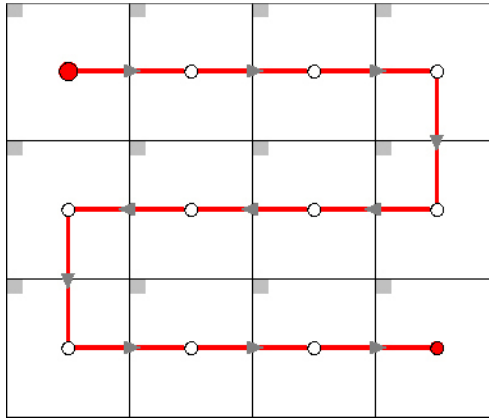
Figure 6-9. The topology is drawn on all panels in the string.

3. The strike in the Remove Link button will change from grey to red once a string is selected indicating that it can now be used.

Click on it to remove the topology.

4. Now hover your mouse over the centre spot of the fixture which is to be at the start of the string. Click and hold the button and drag the pointer to the centre spot of the second panel on the string. A dotted red line will be drawn which will go solid as the line becomes pinned to the centre spot of the next panel in the string. You can now move on to the third fixture in the string and so forth until the string is complete.
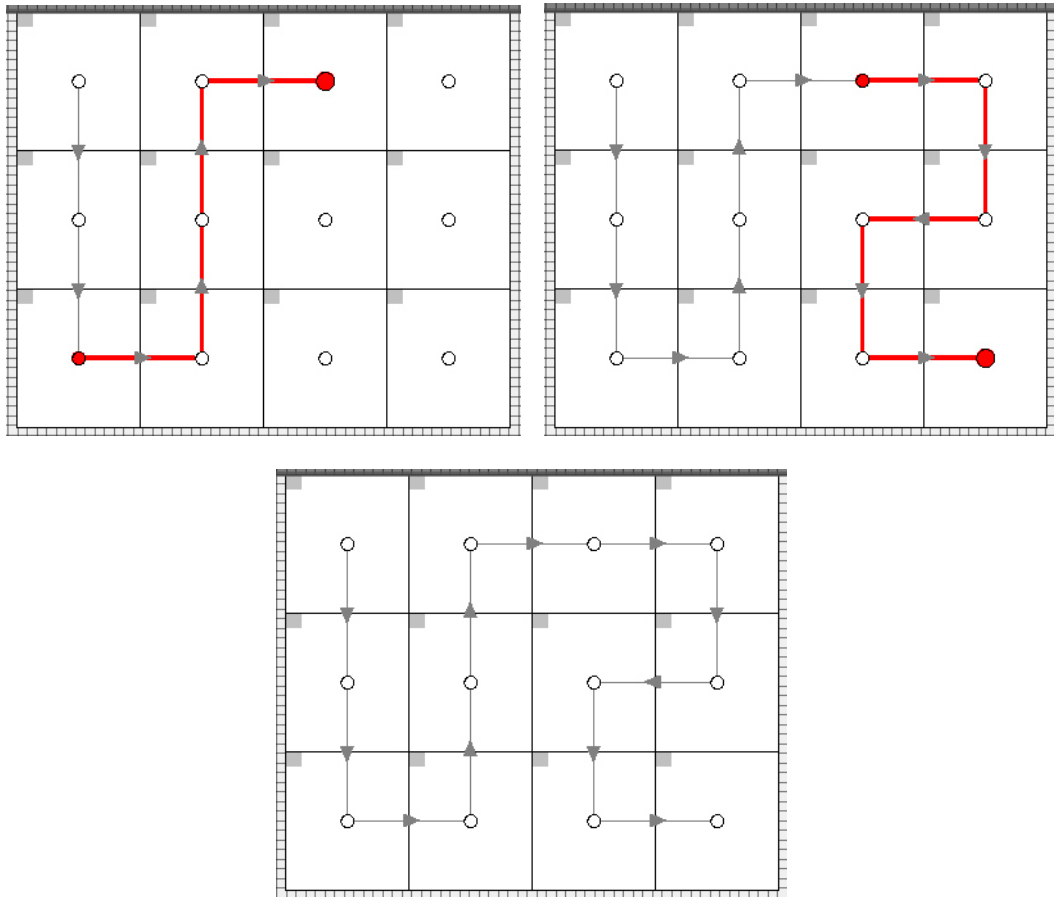
Figure 6-10. Changing the topology by clicking and dragging the mouse pointer

5. Return to the main project toolbar by clicking on the green arrow. The processor will recognise that there is a new topology which doesn't match the current association and will display the Correct Association message for 10 seconds.

The discovered topology doesn't match the expected topology but contains errors that can be corrected. ⟷ Correct Association

Figure 6-11. The Correct Association message

6. Click the **Correct Association** button to finish the process. The fixture icons will display the green dot in the canvas window and content can be displayed on the fixtures "The panels are online and associated." on the next page).
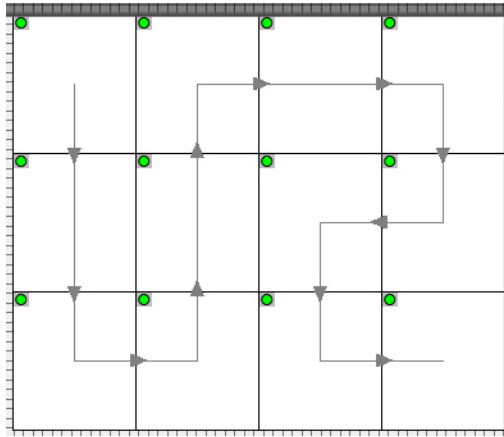
Figure 6-12. The panels are online and associated.

After this time you can correct association by right clicking on the icon of the affected fixture or by selecting **Correct Association** from the Edit menu.

Alternatively you can display the Add Fixtures from Network toolbar to see the unassociated fixtures icon highlighted with a colour. Click on this icon and then click on the first fixture in the string to associate the fixtures. Now click on the green arrow to come out of the Add Fixtures from Network toolbar and the fixtures will associate and come online.

Fixture Layout

Selecting Individual Fixtures

To select a fixture simply click on it. The fixture will turn blue and information such as manufacturer, type and position is displayed on the Properties tab. You can also right-click on a fixture to display a context menu.

Selecting Multiple Fixtures

There are various methods of selecting multiple fixtures:

- Hold down the Ctrl key and click fixtures to select them.
- Alternatively, hold down the left mouse button and drag a selection box around the fixtures to select them (see Selection Mode info box below).
- To select all fixtures on the canvas, you can use **CTRL + A.**

Note - Selection Mode In Settings > Preferences you can change the selection mode from Inside selection area to Overlaps selection area. If 'Inside selection area' is enabled, the line must completely enclose fixtures in order to select them. If 'overlaps selection area' is enabled, a fixture will be selected if any part of it falls within the selection area.

Grouping Fixtures

If there are several fixtures in your configuration that you always want to move and adjust together, it may be helpful to put them into a group. To do this select the required fixtures, right-click and choose **Group** from the dropdown menu. You can also **Ungroup** in a similar manner.

Fixtures can also be added or removed from groups, by selecting a fixture, right-clicking, and selecting **Add to group** or **Remove from group**.

Note - If a group is destroyed by ungrouping or removing the only fixture, and the group is used in a position preset, the preset will also be updated/deleted accordingly. You will be warned that this is about to happen. Any colour overrides associated with that group will be lost.

Moving Fixtures

You can move fixtures anywhere on the Canvas, either within or outside of the Active Area, by selecting the fixture and dragging or pressing the arrow keys on the keyboard. Pressing the arrow keys will move the fixture by grid-space increments if the grid is displayed and snap to grid is enabled or, if not, by pixels.

Rotating Fixtures

Fixtures can be rotated in three ways:

Fixtures can be individually rotated around their top-left corners by selecting them and entering the degree of rotation in the properties tab.

Groups can also be rotated by selecting them and entering the degree of rotation in the properties tab. Groups rotate around their anchor point, indicated by a small circle that is

placed by default in the centre but can be moved by dragging on the canvas or using the Rotation Center settings in the Properties tab.

A selection of multiple fixtures can also be rotated together without needing to group them. To do this, select the fixtures then select the toolbar icon, or press `Ctrl+Shift+R` (or `Cmd+Shift+R` on Mac). A moveable rotation anchor will be placed in the centre of the selection, with a handle which will be dragged to rotate the selection, with the `Shift` key enabling finer-grained rotation.

Figure 6-13. Multiple fixture rotation toolbar icon

Note - The S4 processor can only rotate in 90 degree increments.

For further information on how rotating fixtures affects network load see "Output Capacity" on page 28.

Main Project Screen
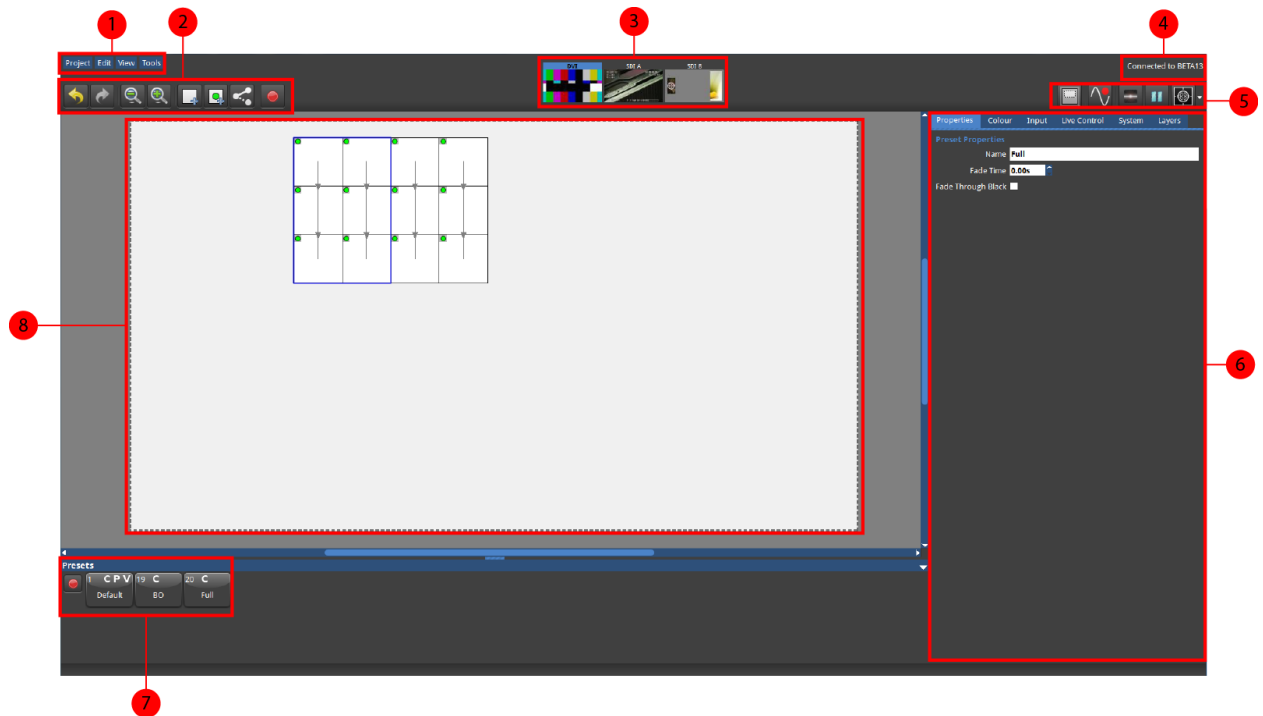
Figure 6-14. Main Project Screen

1. Drop-down menus
2. Left Toolbar:
   - Undo and Redo
   - Zoom In and Out
   - Add Fixtures
   - Add Fixtures from Network
   - Change Topology
   - Record Preset
3. Source Previews
4. Processor Name/ Processor serial number
5. Right Toolbar:
   - Canvas Mode
   - Live Control On/Off
   - Pause/Freeze

- Blackout
- Test Patterns

6. Property Tabs

7. Presets

8. The Canvas

Moving Around the Canvas

Up and down	vertical scrollbar arrow keys page up/down keys mouse wheel
Left and right	horizontal scrollbar arrow keys shift + mouse wheel
Zoom in and out	mouse wheel + Ctrl right-click and select *Zoom to fit*, *Zoom 1:1* or *Zoom to selection*
Drag the canvas	Hold the space bar and left click + drag the mouse

Navigator

Figure 6-15. Canvas with Navigator enabled

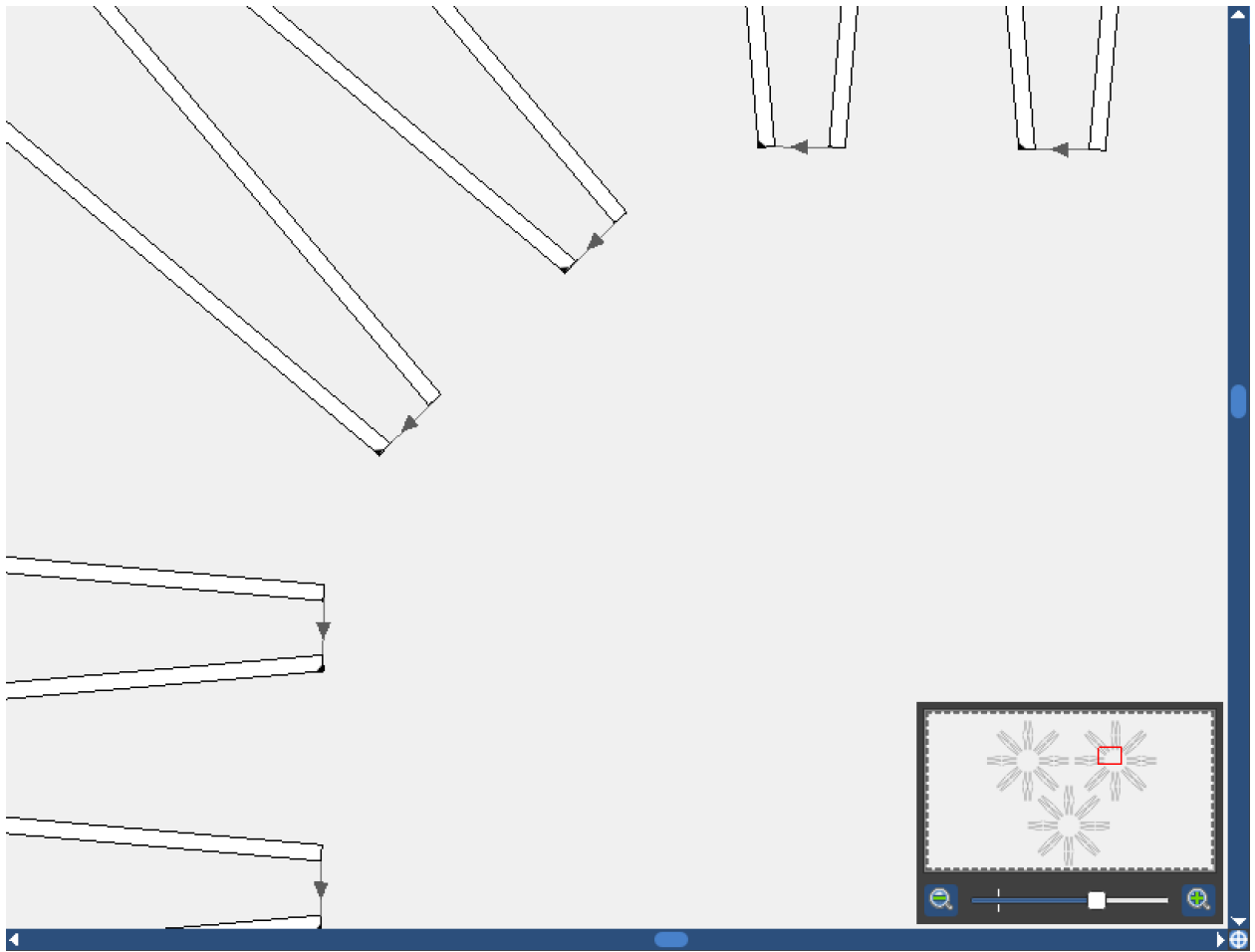The navigator provides a quick and easy way of moving around the canvas and adjusting zoom levels. Toggle Navigator on/off using the button at the intersection of the canvas scrollbar, by selecting *Toggle Navigator* from the *View* menu, or by pressing `Ctrl+Shift+N` (or `Cmd+Shift+N` on Mac).

Navigator provides a mini simplified preview of the whole canvas, with a red box showing the currently visible canvas area. Dragging the box moves the canvas view, and a slider is available for zooming in and out.

Using the Grid

The grid is a useful tool to help align or space fixtures evenly on the canvas. Enabling Snap to Grid will pull fixtures into perfect alignment at all times.

The grid can be displayed by right-clicking on the canvas in the Main Project Screen and toggling **Show Grid** in the context menu. **Snap to Grid** can be enabled in the same way. These options can also be accessed in Tools > Settings > Preferences. Selecting **Properties** from this right-click menu, displays grid colour and spacing options in the Properties tab on the right-hand side of the screen when the canvas itself is selected.

Snap to Fixtures

When laying out fixtures on the canvas it is often helpful to be able to place them exactly adjacent to one another without spaces between them. When **Snap to Fixtures** is enabled a fixture will be pulled towards other fixtures it is dragged near. This option can be accessed in Tools > Settings > Preferences or by right-clicking on the canvas and toggling **Snap to Fixtures** in the context menu.

Canvas Modes

Canvas modes can be selected by clicking on the Canvas mode icon on the toolbar and selecting the relevant mode from the drop-down menu or by using the assigned keyboard shortcut.

Edit Modes

The edit modes allow fixtures to be positioned on the canvas.

Edit Mode:

(keyboard shortcut F1)

Edit Mode is the default mode for the canvas and allows fixture positioning. In Edit mode the fixtures are displayed as viewed from the front.

Rear Edit Mode:

(keyboard shortcut F2)

Fixtures are commonly cabled up from behind and **Rear Edit** allows fixtures on the canvas to be horizontally flipped, as if viewed from behind. This is particularly helpful for figuring out and fault-finding topologies.
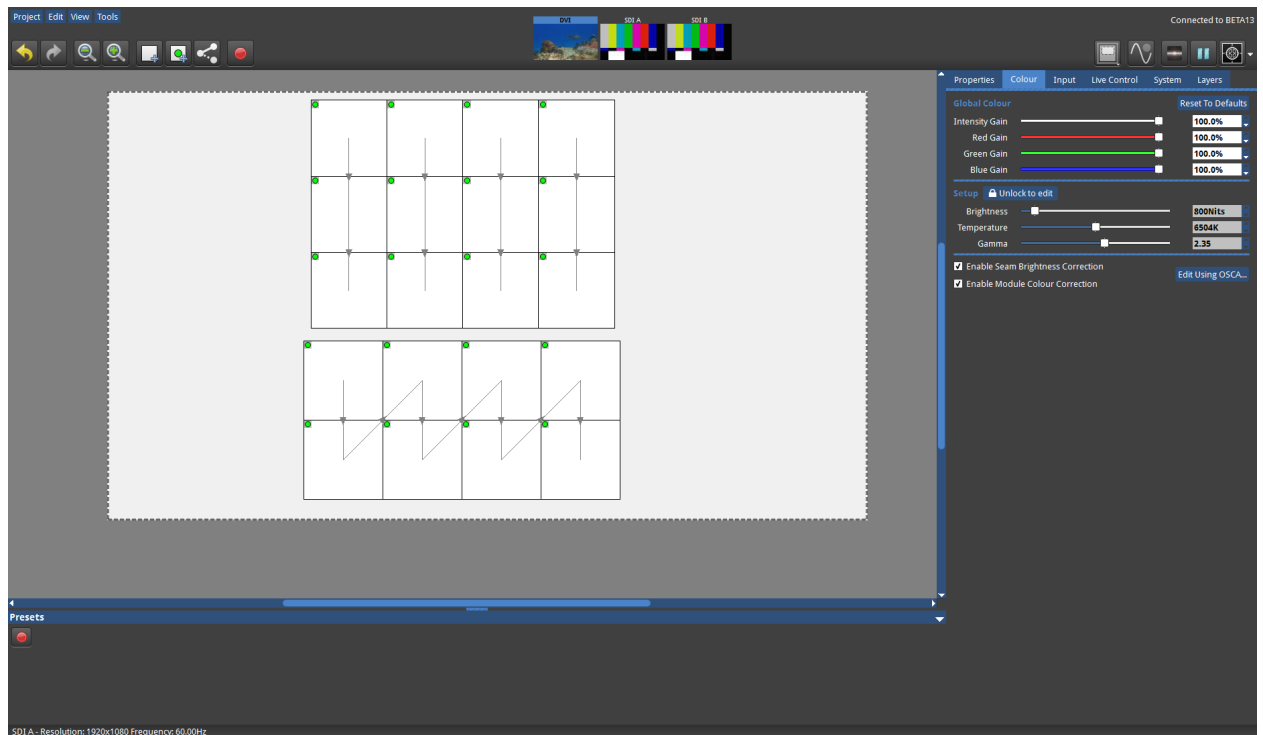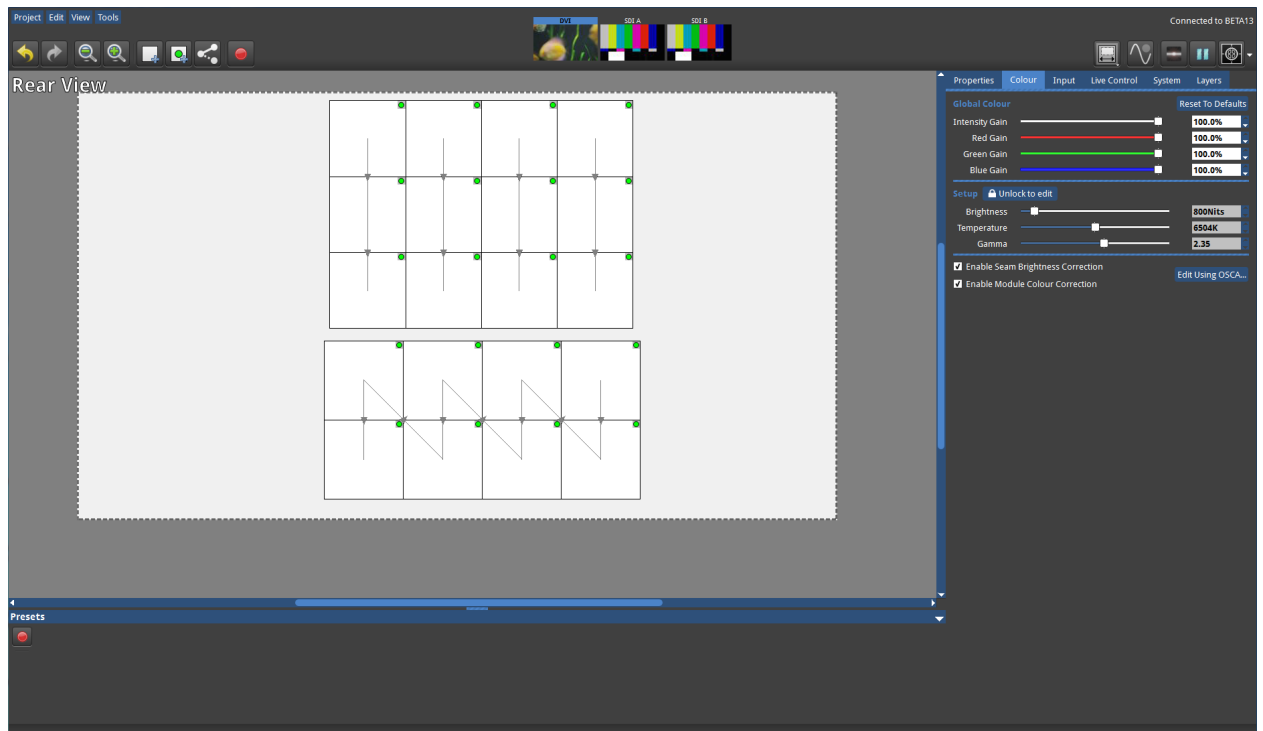
Figure 6-16. Edit Mode

Figure 6-17. Rear Edit Mode

Video On Canvas Modes

Video on Canvas modes allows the display of the currently selected video input, taking into account Viewport and Active Area settings. Video on Canvas Modes are not available on Tessera Remote. Fixtures cannot be moved on the canvas whilst in Video on Canvas Modes.

Fixture Only Mode:

(keyboard shortcut F3)

Fixture only mode displays the currently selected video input as it is being displayed on the fixtures.
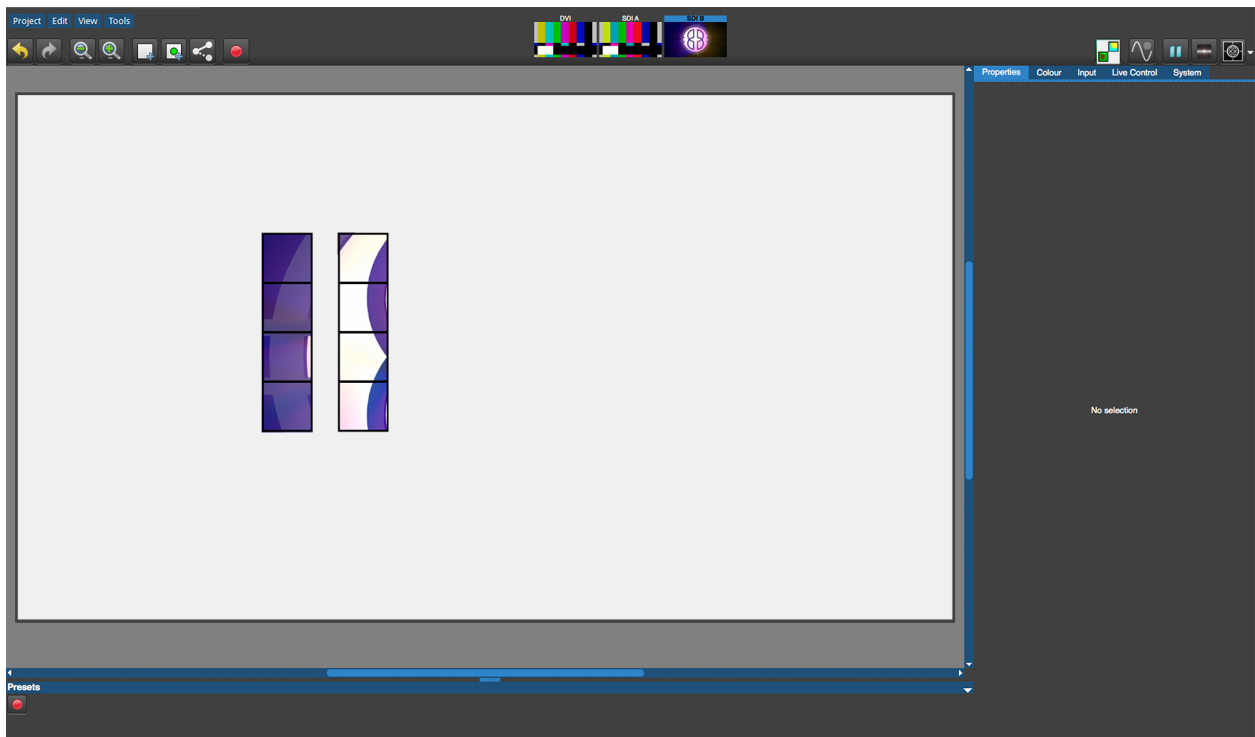
Figure 6-18. Fixture Only Mode

Video and Fixture Mode:

(keyboard shortcut F4)

Video and Fixture Mode displays the currently selected video input on both the fixtures and the canvas. The video within the Active Area that is not being displayed on the fixtures is shown greyed out as shown in the picture below.
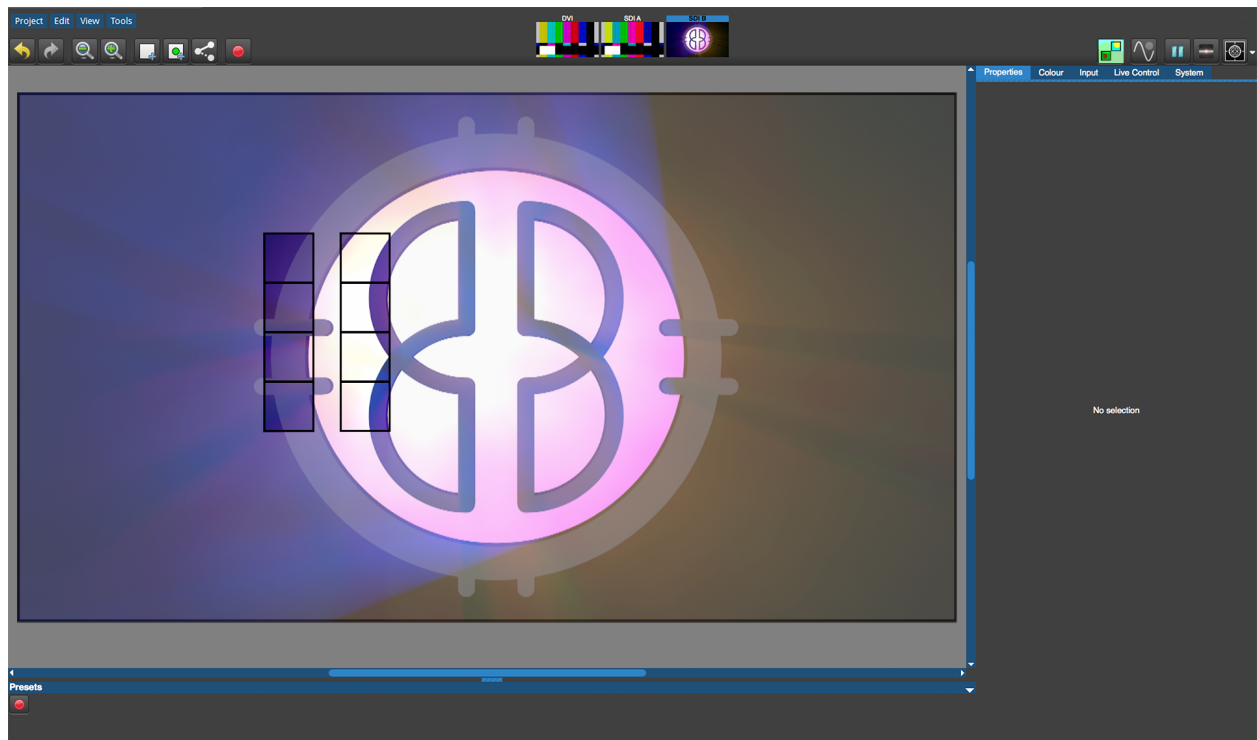
Figure 6-19. Video and Fixture Mode

Video Only Mode:

(keyboard shortcut F5)

Video Mode displays the currently selected video input within the Active Area on the canvas without displaying the fixtures.
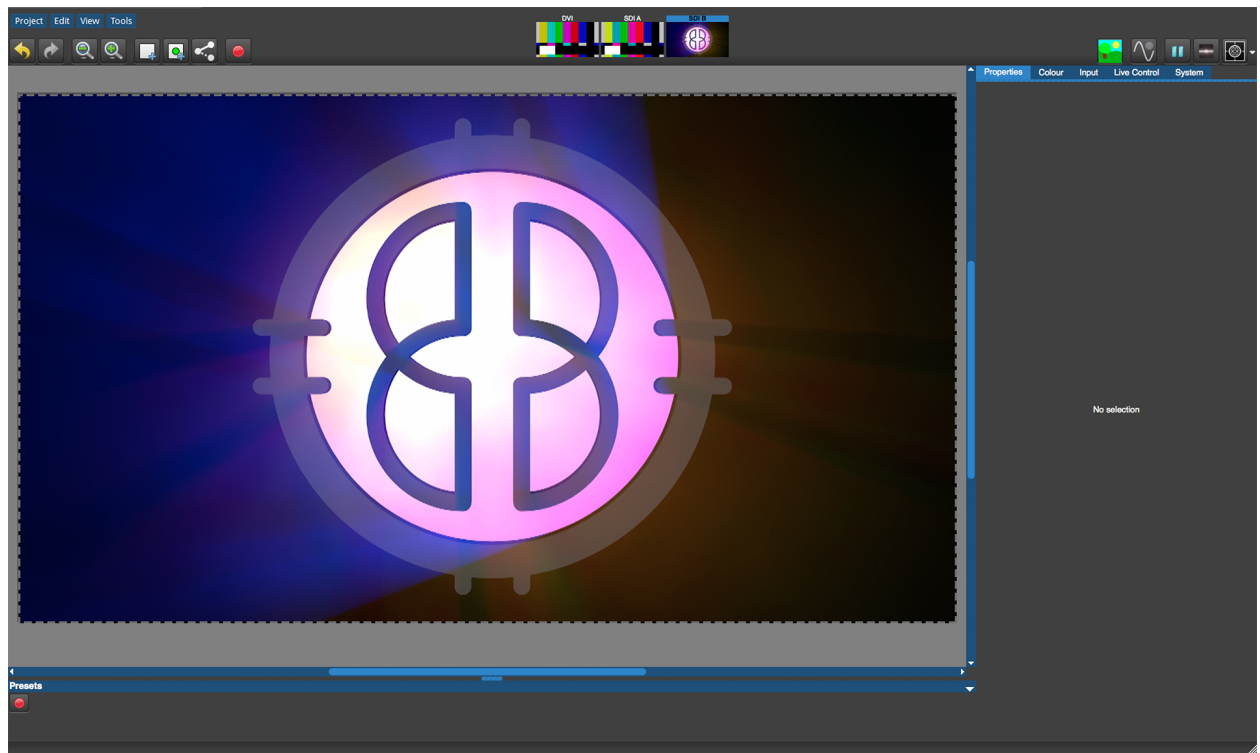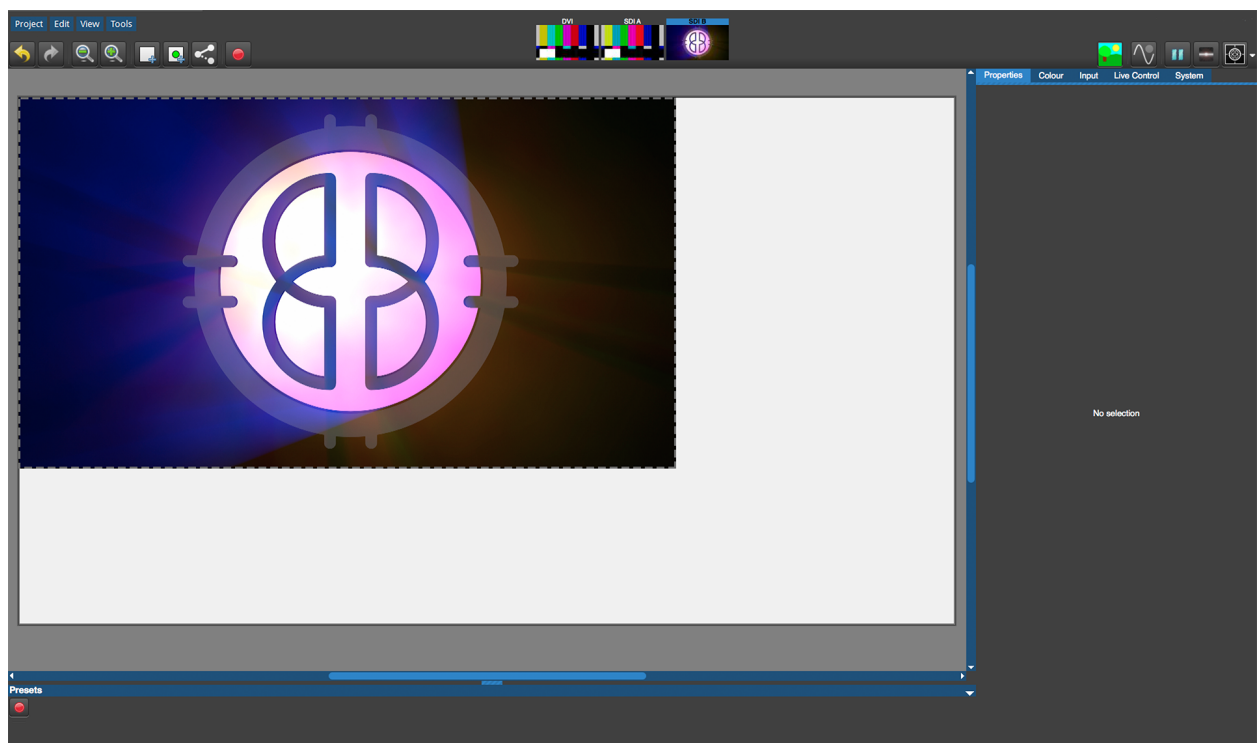
Figure 6-20. Video Mode

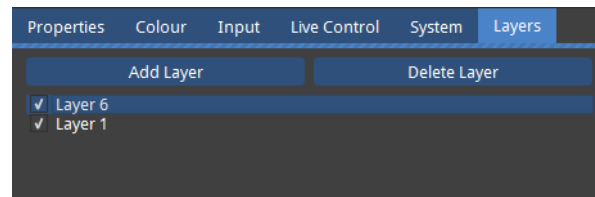*Figure 6-21. Video Mode with scaled input*

Layers

Figure 6-22. The Layers tab

Layers are an easy way of manipulating overlapping fixtures.

Fixtures can be assigned to layers which have a z-order. Z-order refers to the front to back ordering. Assigning panels to layers that make tasks such as On Screen Calibration (OSCA) and other fixture based adjustments easier. Layers are particularly useful when two groups of panels are superimposed on the canvas, so that the content can be easily duplicated on two sets of fixtures, much as in a Imag screen application, with two screens showing the same content on either side of the stage. Layers make it easier and more accurate to select between the two groups of panels to make OSCA or other panel based adjustments.

The tick allows you to show or hide layers without effecting the output. Clicking and dragging a highlighted layer up or down allows the z-order of the layer to be adjusted.

Layers should be assigned when associating fixtures. See "Adding Fixtures to a Project" on page 42. To do this you should be in the Add Fixtures from Network window. Select the relevant layer you wish to add fixtures to. You can create a new layer by using the Add Layer button in the Layer Tab.

With the relevant layer highlighted, add the required fixtures from network. To add fixtures to a new layer, select the layer and add the fixtures to that layer.

A total of 999 layers can be created.

Project Data Export

Sometimes it may be useful to export data from a project, for example for use in a content creation system, or to use as a cabling diagram. It is possible to export data in two formats - image and comma-separated values (CSV).

Image export

To export an image, select *Export Canvas Image* from the *Tools* menu. There are a number of options which control how the exported image is rendered. After choosing the options you will be prompted to select an export location, either on the local file system when using

Tessera Remote or on a USB key attached to the processor when using the local user interface.

The exported image, which will be in PNG format, will be a pixel-accurate representation of the canvas and therefore the image will have the same dimensions as the canvas.

> **Note -** If using the exported image for content creation, we recommend using the image as a guide only rather than a mask. This will avoid artefacts due to aliasing at the edges of small and rotated fixtures.

CSV data export

To export data as a CSV file, select *Export Fixtures* from the *Tools* menu. The CSV file will contain a row for every fixture on the canvas. To choose the columns, select fields from the left hand-list and press >> to move them to the right-hand list. After choosing the fields you will be prompted to select an export location, either on the local file system when using Tessera Remote or on a USB key attached to the processor when using the local user interface.

The exported data can be opened and manipulated in spreadsheet applications such as Microsoft Excel, or in simple text editors.

Chapter 7 - Input Properties

Sources

SDI Inputs

The M2 processor has two SDI inputs.

The SDI A and SDI B inputs are identical in functionality. Each input provides SD-SDI, HD-SDI and 3G-SDI (both level A and level B). Alternatively, both inputs may be used together for dual-link HD SDI. All common broadcast resolutions are supported, including 720p50/60, 1080i50/60 and 1080p50/60 and fractional frame rates such as 59.94. For a full list "Supported Resolutions" on page 140.

The physical connections to the SDI A and B inputs are via standard BNC connectors and in addition to each input there is a re-clocked thru connector which allows the daisy chaining of a signal to a second processor or monitor.

There is also an active SDI Out for each channel which is for future implementation.

DVI Input

The M2 processor is fitted with a DVI-I input, but the T1 and S4 processors have a DVI-D input.

All Tessera procesors are capable of receiving digital (DVI-D) signals up to full HD 1080p60 resolution at frame rates from 24Hz to 60Hz to a maximum pixel clock of 148.5MHz.

The M2 processor is also capable of receiving analogue VGA/RGBHV inputs up to full HD (though for this you will need a suitable adaptor for the DVI-I input port).

The DVI-I input may also be used to receive standard definition or high definition component video (YPbPr) via a passive DVI to BNC breakout cable. In addition to the DVI-I input there is also a re-clocked DVI-I output.

HDMI can be supported by use of a suitable adapter, however, the Tessera processors does not support HDCP.

Source selection

The three video inputs on the Tessera M2 processor are mapped to two input pipelines to allow crossfading between sources.

Although it is possible to crossfade from input to another ("Crossfading (M2 only)" on page 75), it is not possible to display multiple inputs simultaneously, either as picture-in-picture or as discrete windows.

The incoming video on each of the three inputs can be quickly viewed in the Main Project Screen where you will see the three Input Thumbnails ("Source preview thumbnails." below).

Figure 7-1. Source preview thumbnails.

The currently selected input will have its legend highlighted in blue. The quickest way to change inputs is to double click on the input you wish to switch to. Alternatively, you can click on the Input tab to see the **Source** drop down menu and select the different inputs from here.

As T1 and S4 processors only have a single DVI-D input, this is always selected.

Any of the inputs may be used as a reference signal for genlock (See section "Genlock Settings" on page 105).

Scaling and Cropping

The Tessera M2 and T1 processors achieve scaling and cropping of the incoming feed by use of three settings in the input tab: Viewport, Zoom and Active Area. Scaling and cropping are not supported on S4 processors.

Viewport

The Viewport settings define the region of interest of the incoming feed which is captured to the canvas. Typically this will be captured in full, so an incoming HD feed would have settings of:
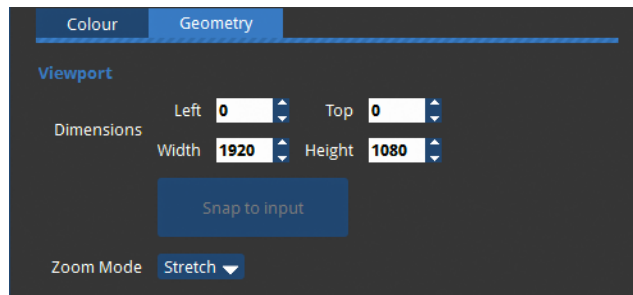
Figure 7-2. Incoming 1920x1080 video at its original size.

If however you wish to capture only part of that incoming feed (perhaps because you then wish to expand the image to fill the canvas) you can set these values accordingly.

For example, if you wished to capture a window of PAL content being displayed towards the bottom right corner of an HD feed you might set the Viewport to:
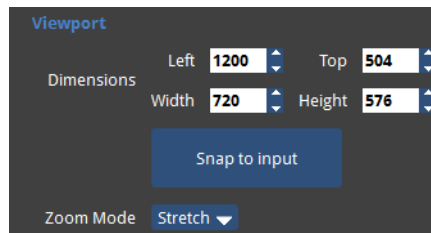
Figure 7-3. Viewport set to bottom right corner

In addition to the left, top, width and height parameters there is also a **Snap to Input** button. This automatically sets the width and height to match the full size of the incoming video feed.

Active Area

On the canvas, the Active Area is indicated by the pale grey area with a dashed border ("The canvas with the Active Area shown by a dashed border." on the next page). Settings are found on the Geometry section of the Input tab.
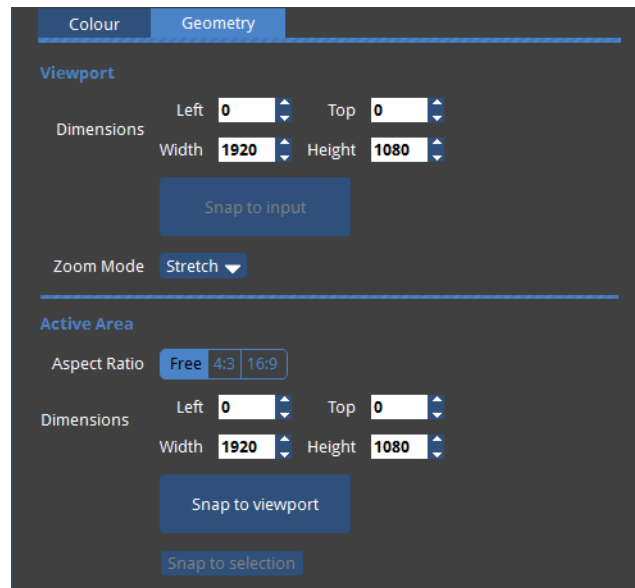
Figure 7-4. The Geometry Tab
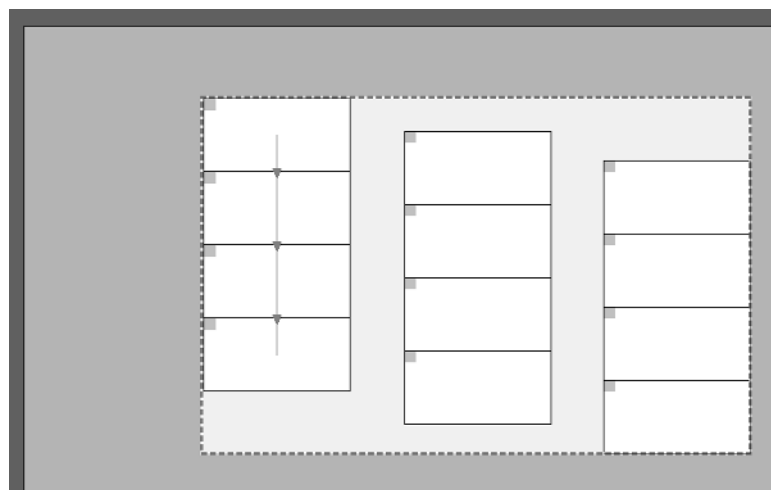
Figure 7-5. The canvas with the Active Area shown by a dashed border.

Having determined the region of interest to be captured from the incoming feed using the Viewport, that region can then be sized or moved to the appropriate part of the canvas.

To set the Active Area to the same dimensions as the Viewport click the **Snap to Viewport** button. Content will be shown with no scaling but with cropping according to the Viewport Settings. As with the Viewport setting, the Active Area will default to the same parameters as the incoming video feed.

To scale the content, you can set the Active Area dimensions to values greater or smaller than the Viewport. You can change the size of the Active Area by dragging the dashed line on the canvas or entering values in the Width and Height fields. The active area may not be greater than what the maximum canvas size has been set to.

To change position use hand cursor or adjust the top left coordinates manually.

Snap Active Area to Selection

To automatically size the incoming image to fit on a particular group of fixtures, select the chosen fixtures and click the **Snap to Selection** button

The Active Area will then be sized and positioned to fit over the selected fixtures.

4:3 and 16:9

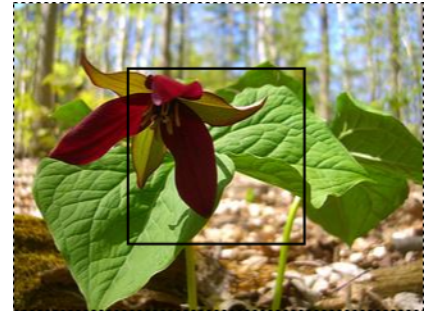The 4:3 and 16:9 buttons will automatically adjust the width parameter of the Active Area to the chosen ratio based on the height. For example, if the Active Area dimensions are width 200 x height 90, clicking the 16:9 button would reduce the width to 160 and the height would remain 90.

Zoom

The Viewport is scaled and mapped onto the Active Area according to the Zoom mode. The zoom options are:

1:1	The original Viewport image size.	
Fit	The aspect ratio of the Viewport is maintained with the image scaled to fit within the active area.	
Fill	The aspect ratio of the Viewport is maintained with the image scaled to fill the active area.	
Stretch	The image is scaled to the exact dimensions of the active area without maintaining aspect ratio.	

Input Colour Control

Black Level

The black level control affects the base level of brightness of the darkest content in the incoming feed. Lowering this value will make all parts of the image look darker (except for white) but will be most pronounced at the lower end of the video signal nearest black. For optimum adjustment of the black level a PLUGE or greyscale line-up pattern can be useful.

Contrast

Just as the black level control sets the threshold of the base level of dark content, the contrast slider sets the threshold level of bright content. Boosting this level will increase the differential in luminance between the darkest content and the brightest content.

Hue

The hue parameter of the input controls allows the user to adjust the spectrum of the incoming video feed. At the extreme this will reverse the colours assigned to each area of a given hue.

Saturation

The saturation parameter determines the level of colour in the image and can be used to increase or reduce this. At the extremes this would make the image monochrome with only brightness information intact or boost its colour to give a more colourful (perhaps too colourful) image.

RGB Shadow

In addition to being able to set a black level for a given input it is also possible to set the black level specifically for each of the primary colours in that input. These sliders, called RGB Shadow, equate to a setting for the black level of each specific colour.

RGB Highlight

In addition to being able to set contrast for a given input it is possible to set a contrast (white level) for each of the primary colours also. These parameters are called RGB Highlight.

Histograms

A useful tool offered by the Tessera processor is a selection of histograms. Histograms depict distribution of pixels across the possible range of a colour or colours of the incoming

video feed in real time after they have been modified by the input colour controls. There are six different histograms available:

- Luminance
- Red
- Green
- Blue
- Red, green and blue and luminance with separate histograms
- Red, green and blue luminosity with overlaid histograms

All histograms can be displayed linearly or logarithmically.

Their main use is to allow the user to identify and compensate for perceived deficiencies in the incoming video feed. The user can then see how changes to the input colour controls may be affecting the colour content of that feed. By adjusting those controls it may be possible to boost the amount of colour depth of the displayed signal, resulting in a better distribution of peaks in the histogram.

The X-Axis of each histogram is graded from 0% to 100% and shows a column to indicate how much content there is at that percentage of the given colour. The Y-Axis showing the amount of content at a particular percentage is auto-ranging in scale and adapts to fill the axis.

The logarithmic scale will accentuate small columns so tiny areas of a particular colour can be visualized in instances where one particular percentage dwarfs all others.

Figure 7-6. Test pattern showing colour bars at 75% and the corresponding Linear RGB histogram.

The above picture shows a test pattern and its corresponding Linear RGB histogram. Note that there are clear columns at 75% for each of the three primaries. This is because all of the colours are either primary colours at 75% (red, green and blue sections) or secondary colours made from combinations of the primaries at 75% (cyan, yellow, magenta and white sections). There is also a large peak at 0% on the left which shows how much black there is in the image (quite a lot) and also a clear peak on the right which shows an area of 100% RGB and is caused by the single block of 100% white towards the bottom left of the image (you can see

this white is noticeably brighter than the grey-looking vertical section white is made by mixing 75% red, green and blue).
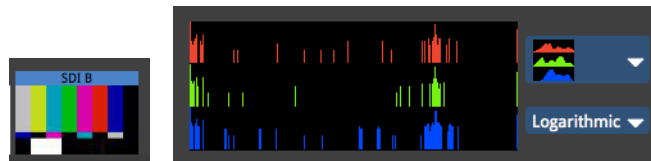
*Figure 7-7. Test pattern showing colour bars at 75% and the corresponding Logarithmic RGB histogram.*

The above picture shows a logarithmic visualization of the input. Although the same three areas 0%, 75% and 100% show the highest concentrations of columns there are now more areas visible. So we can see that there are some small amounts of colour which deviate from these three values and the image is not quite as perfectly composed of 75% colour as might have been assumed from the linear scale.

The fact that the peaks corresponding to the black and white areas of the input image are located at the very start and end of each histogram indicates that this content source is well balanced and the full spectrum is being used.

## Setting Colour Controls with the Aid of Histograms

The histograms can be useful in determining if a particular incoming signal is filling the entire spectrum of colour and brightness.

> **Note -** When choosing an image to balance, it is wise to either use an image which is similar to the content you plan to show throughout your project, an image with a wide variety of colours and hues, or a suitable test pattern.
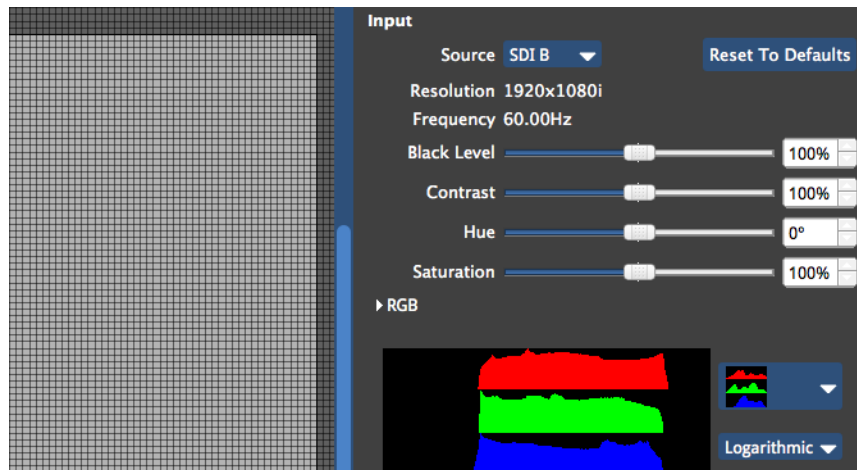
Figure 7-8. A fairly washed out incoming signal on SDI-B (see thumbnail top left) with the corresponding histogram for red, green and blue when the Input Colour Controls are set to default.
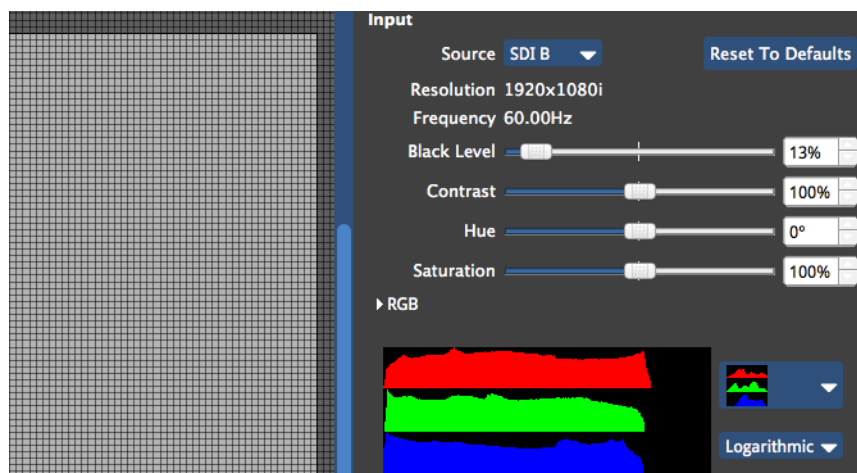
Figure 7-9. Adjusting the black level control will make the blacks look darker and the concentrations of colour now reach down to 0% on the scale.
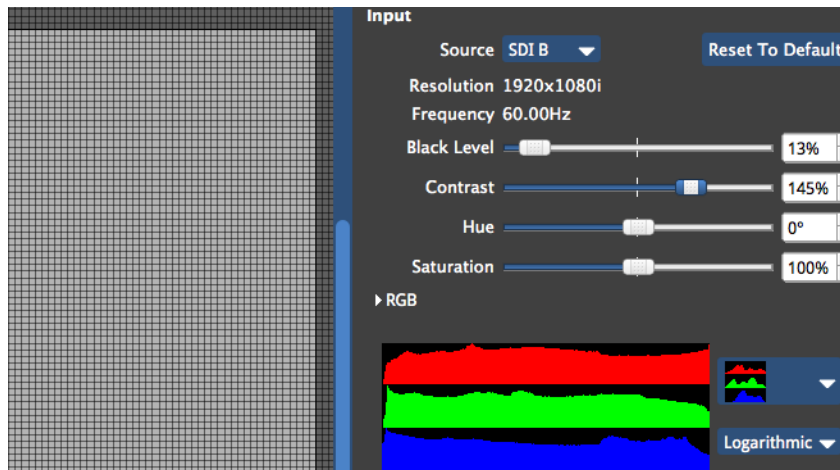
Figure 7-10. Adjusting the contrast control will make brighter areas appear closer to the 100% threshold, assuming you have some areas of white content in your image and this is desirable.

If specific colours do not appear to be rendering correctly you may wish to adjust the RGB Highlight and Shadow controls to work on that specific colour without affecting the other two primaries. At this point it may be helpful to look at the histogram for each colour individually.

Crossfading (M2 only)

Crossfading between inputs is achieved by storing the different inputs as presets with a crossfade time. To store presets to crossfade from one input to another follow these steps:

1. Select the input you wish to create a preset for (all tiles will change to this input).

2. Click the preset record button. If the tiles of the group are selected they will appear red. If they appear with diagonal striped lines select them again.

3. Now hit the Preset button on which you want the new preset to reside. Right-click the preset to rename it.

4. Click on the input thumbnail of another input to change to that input.

5. Repeat steps 1-4 to create a new preset for this input.

6. Now right-click on each preset in turn to see its properties and to set a fade time for the preset.

You are now ready to use the presets you have created to crossfade between the inputs.

*As inputs are global to all tiles it will not matter if all the tiles in the system are in this group or not. Selecting the resulting preset will always change the input for the entire system.

Note - What happens when you change inputs on the M2? The M2 processor has two input pipelines each of which can process up to a 1920x1080p raster at 60Hz. When an input is selected, that input gets mapped to the currently unused pipeline and this is then fed into the mixer and scaler functions of the processor further down the line. Once any crossfading is complete the other pipeline is then free for the next selected input, as and when that is chosen.

Chapter 8 - Colour and Brightness

There are several ways to modify the colour and brightness of fixtures connected to the Tessera system. The correct controls to use will depend on the source of the problem to be addressed, or the creative effect desired.

- Global colour - the controls on the Colour tab will affect all fixtures connected to the processor, except where per-fixture or per-group overrides are active. See "Global Colour" below.

- Per-fixture and per-group colour override - colour and brightness settings can be overridden for specific fixtures or groups by enabling the Override Global Colour option on the Properties tab. See "Per-fixture and Per-group Colour Override" on page 80.

- Input colour - provides controls for modifying the colour balance of a specific input (DVI, SDI or analogue). See "Input Colour Control" on page 70.

- On-Screen Colour Adjustment (OSCA) - discussed in "On-Screen Colour Adjustment" on page 115, OSCA provides a way of compensating for colour mis-matches between modules and the appearance of bright or dark seams.

- ChromaTune - discussed in "ChromaTune" on page 81, ChromaTune provides tools for making more precise tweaks to specific colours in an incoming video feed.

Global Colour

The following controls are available in the Global Colour tab, and apply to all fixtures in a project unless those fixtures (or groups) have been overridden as described in "Per-fixture and Per-group Colour Override" on page 80.

Intensity Gain

The Intensity Gain slider allows users to modify the light output of all the fixtures in the system in a perceptually linear way, so at 50% fixtures will look half as bright to the naked eye as they did at 100%. The precise light output of the screen will depend on this value in conjunction with the Brightness slider.

Brightness

The brightness scale allows adjustment of the light output of the screen. As all fixture types are calibrated when the profile is written, the brightness scale is expressed in Nits (candela/m^2). This means arrays with different fixtures can quickly be set to the same output level.

Where more than one type of fixture with different maximum brightness values is used, the slider will cease to have an effect on a fixture's brightness once its maximum value is exceeded.

The brightness slider will have a default value of the brightest value that all the fixtures in a project can reach. Therefore if a project consists of two different types of fixtures, one of which has a maximum output of 5000 Nits and one of which has a maximum brightness of 2000 Nits the default value of the brightness slider will be 2000 Nits. Similarly the maximum value of the slider will be the value of the brightest fixture in the project, so in this example it would be 5000 Nits.

Note - If you wish to control the brightness of an array including different types of fixtures whilst maintaining their relative brightnesses then this is best achieved by leaving the brightness slider at default and modifying the intensity slider.

RGB Gain

The RGB gain controls allow the user to adjust the level of each of the primary colours in the output to the connected fixtures. Their default value is 100%.

Adjusting all 3 RGB sliders to 50% would have the same effect on perceived brightness as lowering the Intensity slider to 50%.

Colour Temperature

The Temperature slider allows the user to adjust the white balance of the fixtures attached in a range from 2,000-11,000 Kelvin.

Gamma

Gamma can be modified in a range from 0.2 up to 4.0. The default gamma setting of the M2 is 2.35.

Note - Gamma or gamma correction is a way to adjust how bright the midtones in the image appear without affecting the very dark or very bright areas of the image. A higher value results in lower brightness. If images are not gamma encoded, they allocate too many bits or too much bandwidth to highlights that humans cannot differentiate, and too few bits/bandwidth to shadow values that humans are sensitive to and would require more bits/bandwidth to maintain the same visual quality. By increasing the differential between areas of shadow and light in certain parts of the luminance curve of a particular piece of content it is possible to increase the amount of detail that can be perceived by the eye, thus rendering the image in more detail and with more contrast. This gamma correction is done by a simple function. In most computers images are encoded with a gamma constant equivalent to about 0.45 and so are decoded with a gamma of approximately 2.2. Mac computers used to be encoded at 0.55 and hence decoded at 1.8. This is why it often helped to set a lower gamma value on the output of a display when it was connected to a MAC computer source for best results. Since the Mac OSX Snow Leopard release Apple have changed their default gamma values to a value more in line with the 0.45/2.2 ratio used by other manufacturers.

Dark Magic

Often, LED panels are run at substantially lower brightness than their maximum, such as for indoor and 'on-camera' applications. This results in an unavoidable reduction in effective bit depth, which can lead to visible artefacts such as banding and loss of detail, especially in dark areas of the image. Dark Magic helps to alleviate these issues by processing the video signal at up to 26 bits per channel (78 bits per pixel) within the receiver card and then increasing the effective bit depth of the output.

Enabling Dark Magic will typically substantially increase the visual quality of the output when operating at low brightness, though a small amount of 'fizz' may become visible at very short viewing distances. Increasing the viewing distance will overcome this, but in some circumstances it may be preferable to uncheck the Dark Magic checkbox.

The greatest improvements can be seen when running very high brightness panels at a much lower brightness, adjusted via the *Brightness (Nits)* control.

Dark Magic is available for all Tessera fixtures, except sub-fixtures and those using older receiver cards. Project files must be created in software version v1.4 or newer to support Dark Magic.

Low End Boost

In the same way that the Gamma control adjusts the midtones of video content, the Low End Boost control adjusts the brightness of darker video content areas. For the most accurate reproduction, this control should normally be left at 0%, but in some cases a higher setting may help to recover detail in dark areas of the content. Care should be taken not to push this control too far as it may start to reveal limitations in the content such as compression aftefacts and camera noise that normally would remain hidden.

Low End Boost is available on all Tessera fixtures, but defaults to 0% when creating a new project for the most accurate reproduction. Project files must be created in software version v1.4 or newer to support Low End Boost.
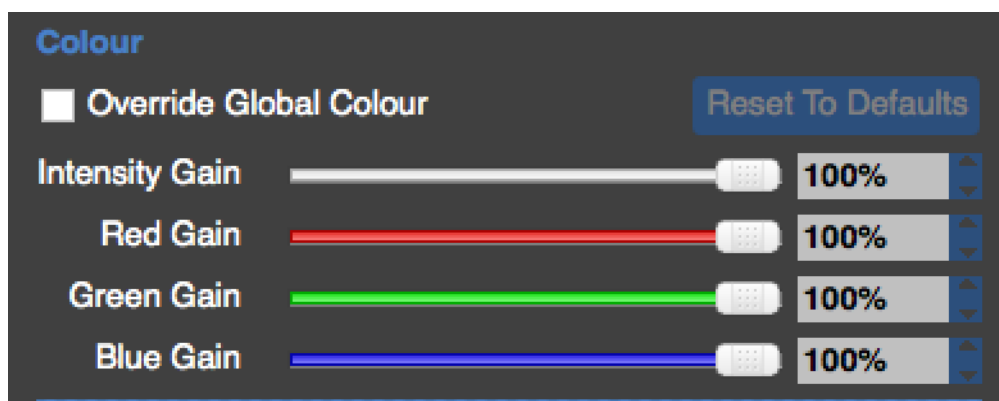
Per-fixture and Per-group Colour Override

Figure 8-1. Global Colour Override

It is possible to remove single fixtures or groups of fixtures from the control of the Global Colour sliders and assign values to them separately. This functionality may be useful if you wish to maintain one whole screen at a constant brightness when there are fixtures grouped into separate screens on a processor.

The option to Override Global Colour is found on the Properties tab. To do this first select the fixture or group you wish to override. If you wish to override a number of fixtures simultaneously with the same values then first select them and make them into a group.

If the selection is a single panel you have the option to adjust Intensity, Red, Green and Blue gain sliders for the selection.

If the selection is a group there is also the option to control Brightness, (Colour) Temperature and Gamma.

Note - Once a selection has been overridden on the Properties tab the global colour controls will have no effect on it until the Override Global Colour box is unchecked.

ChromaTune

ChromaTune Tab is only available on the M2 processor allows two advanced colour correction features.
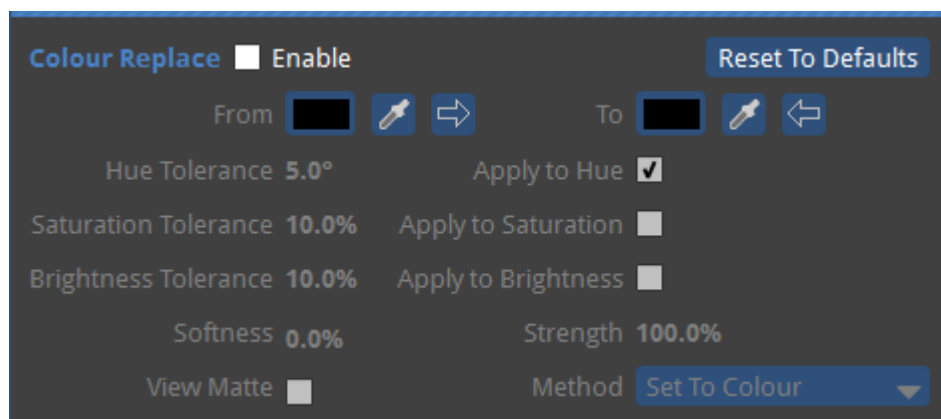
Colour Replace

Figure 8-2. Colour Replace

Colour Replace allows one colour of an incoming source to be replaced by another. The Enable check box activates the effect.

From allows the selection of the colour or colour range to change. The colour can either be selected by using the colour picker by clicking on the colour chip, or if using the processor rather than the Remote application, clicking on the eye dropper can be used to select the colour from the incoming source on the canvas.

Figure 8-3. From and To colour chips. Note the eyedropper.

To allows the selection of colour or colour range that you wish the replace the From colour with. The colour can be chosen in exactly the same way as From, either by clicking on the colour chip and selecting a colour from the colour picker or by using the eyedropper tool.

The arrows featured next to the eyedropper tools transfer the colour from the respective colour chip to the other colour chip. e.g. clicking on the From arrow transfers the colour from the From colour chip to the To colour chip.

Figure 8-4. Selecting a colour from the colour picker.

Hue Tolerance: Hue Tolerance is the amount of difference from the selected hue that are going to be changed. Hue Tolerance works using the Hue wheel.

Saturation Tolerance: Saturation Tolerance is the amount of difference in saturation from the colour that is going to be changed.

Brightness Tolerance: Brightness Tolerance is the amount of difference in brightness from the colour that is going to be changed.

Softness: Softness determines the 'softness' of the edges of the matte used to determine the areas effected by the replaced colour and those not.

Apply to Hue, Apply to Saturation, Apply to Brightness These checkboxes apply the tolerance settings to their respective parameters.

Softness This refers to the amount of softness applied to the edges of the correction matte . The higher the value the smoother the transition between the area affected by the colour change and those areas not affected.

View Matte This shows the grayscale correction matte used to show the level of effect that affects each pixel. White areas show areas affected the most, whilst black areas show areas that remain unchanged.

Method *Set To Colour* directly changes the affected pixels to the **To** colour. *Transform To Colour* transforms affected pixels toward the **To** colour using HSL interpolation. The amount of change for affected pixels is dependent on how close the pixels are to the **From** colour.

Example

A red pepper can be changed into green pepper easily. Here is the original pepper:
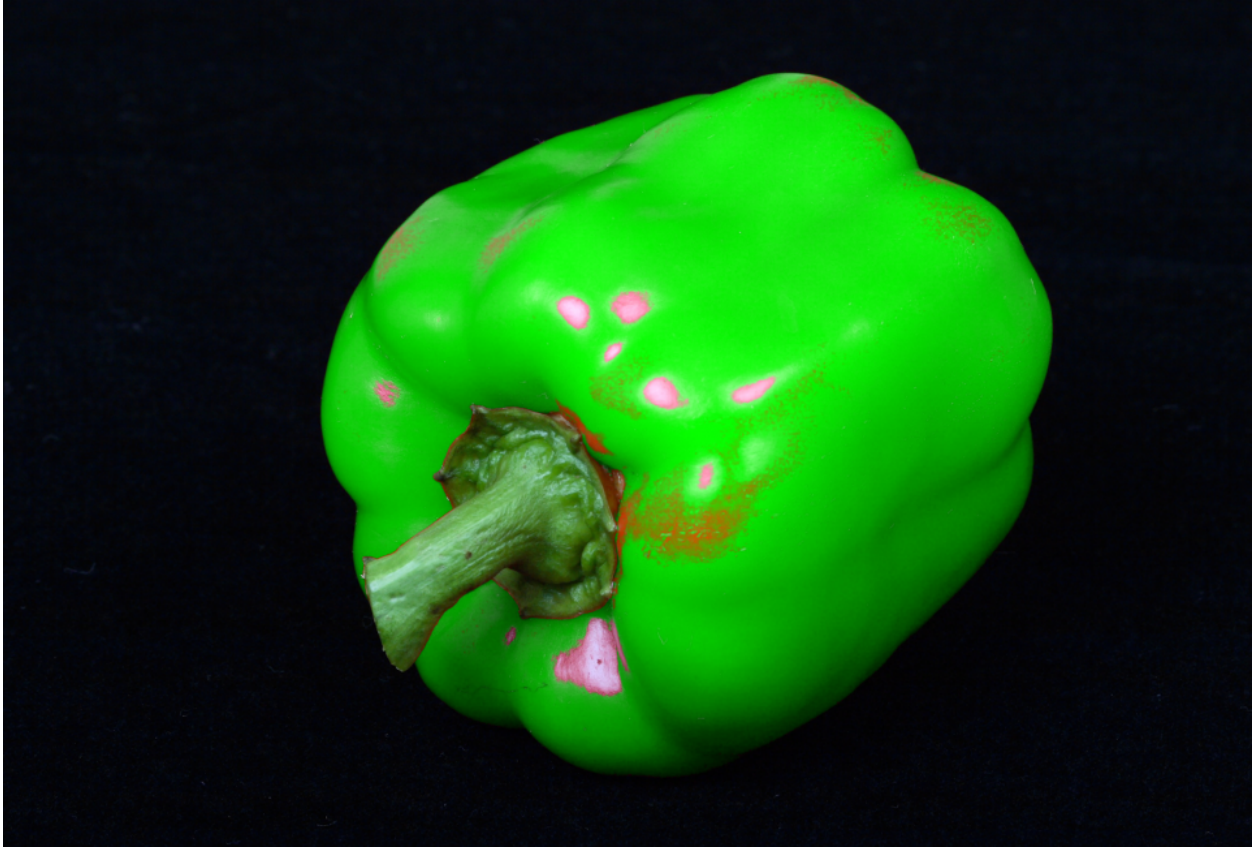

Figure 8-5. Original red pepper.

By selecting a red colour from the from the canvas using the eyedropper tool, and a suitable green from the colour picker:

Figure 8-6. From and To colour chips with red and green colours.

This results in the following:

Figure 8-7. The resulting image after the From To operation.

To turn the pepper completely green requires a bit of tweaking, in this case increasing the Hue Tolerance parameter to 25%. This results in a completely green pepper.
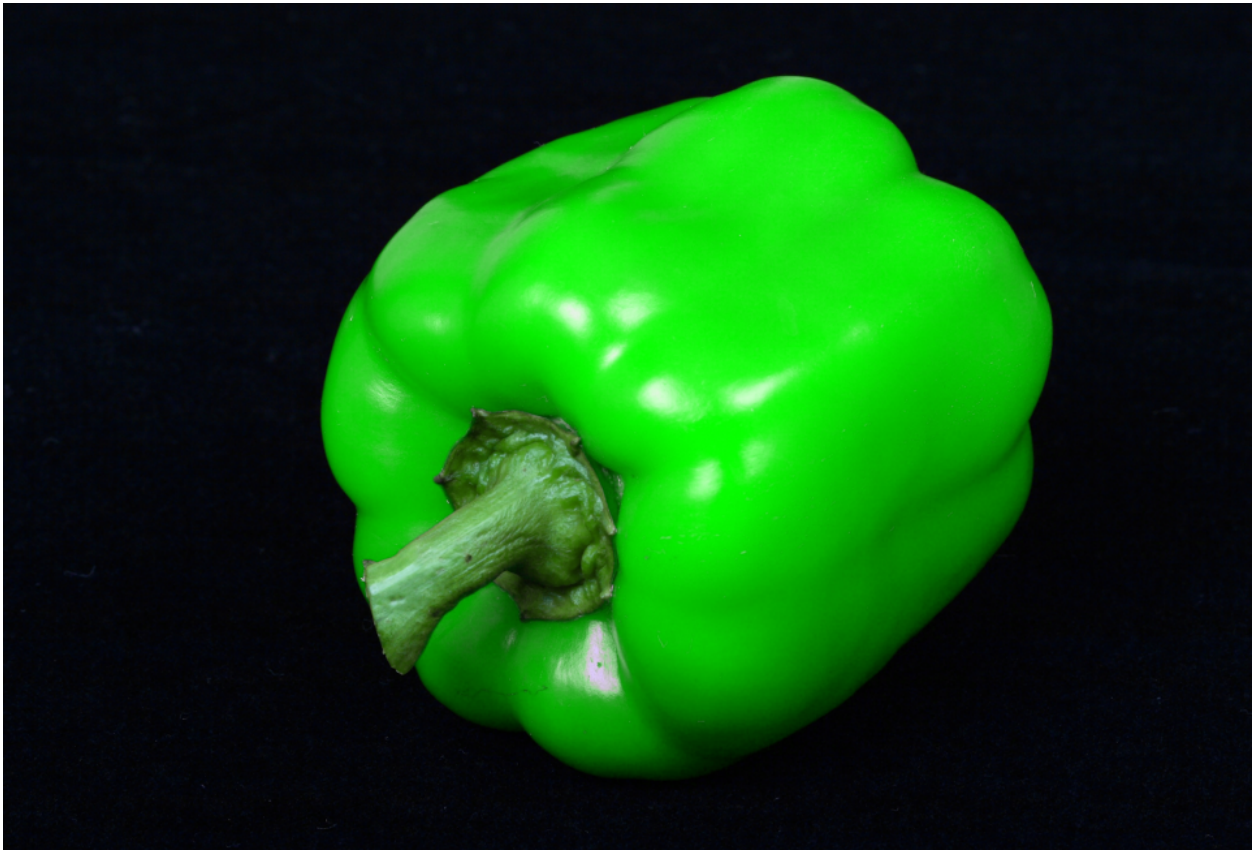
Figure 8-8. The resulting green pepper after increasing the Hue Tolerance.

It can very helpful when using colour replace to use the View Matte feature. This shows the areas of the image that will be affected by the colour replace operation.

Figure 8-9. The View Matte feature.

14-way Colour Corrector

Figure 8-10. 14-way Colour Corrector

The 14-way Colour Corrector allows one or more of 14 pre-defined colours to be adjusted without affecting other colours. Hue, saturation and brightness controls are provided for each of the primary, secondary and tertiary controls. Black and white can be adjusted using RGB gains.

Adjustments are made by entering a numerical value, or by clicking and dragging left/right to decrement/increment the value.

Chapter 9 - Presets

Presets

Presets are a way of storing the settings that you make on the processor so that they can be recalled quickly and easily. These presets can be made to affect all the panels or a small selection of them depending on how they are grouped. This information may be brightness, colour input or perhaps positional information. Video and Colour Presets affect all groups, Position presets affect the particular Group of fixtures they were recorded for.

The preset buttons can be seen at the bottom of the Main Project Screen.
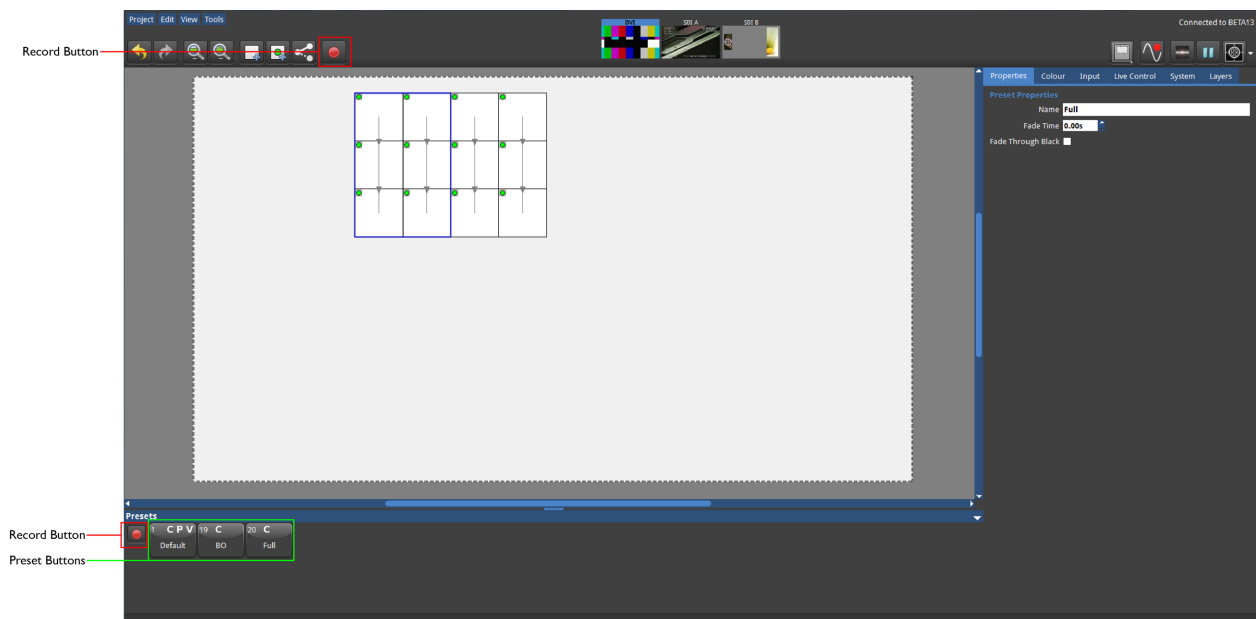
Figure 9-1. Main Project Screen with record buttons highlighted.

Presets are a powerful tool for recalling parameters and fixture positions. For example, if a screen is in place for an outdoor festival it may be useful to set different colour and brightness settings during the day to compensate for changes from day to night-time or cloudy versus sunny conditions. Storing these changes as presets means they can be recalled quickly the next day when conditions change again.

Types of information can include:

- Positional information - the placement of Groups of fixtures on the canvas.
- Colour information - the colour parameters in the colour tab (global colour) and also the per panel and per group colour values in the Properties tab.
- Video information - the parameters contained in the inputs tab including the selected input source, the colour and brightness information for each input and the geometry information (Viewport and Active Area).

Pressing one of the Record Preset buttons opens the Preset Recording view.

Using Masking
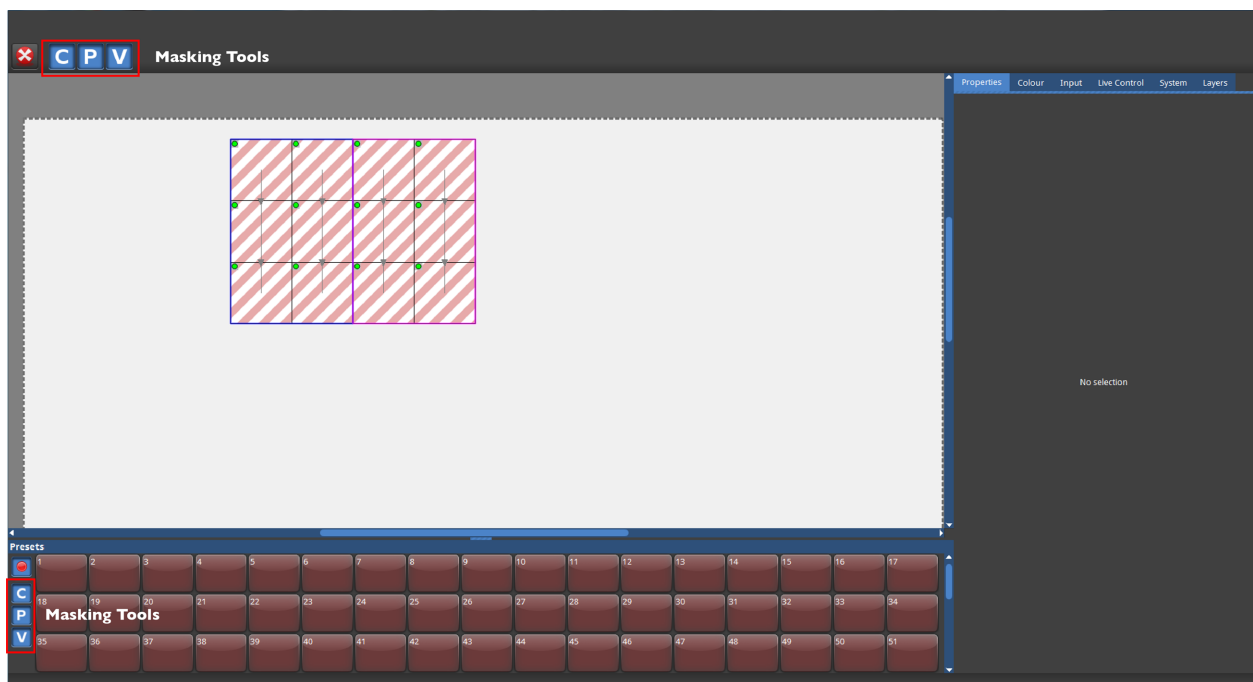
Figure 9-2. Preset Recording view

Sometimes it may be desirable to load positional information without changing the colour information of a group of panels or perhaps change the input source without affecting the global colour. This can be achieved by using masking.

When you store a preset the three letter icons C, P and V that appear after pressing the Record button are all lit in blue (default). This indicates that, in this preset state, information will be stored for all the values of colour, position and video that are currently set for those panels. If you click on any one of these icons at this point it will be deselected and turn grey. So it is then possible to store just the colour, position or video settings or a combination of the three.

Recording Presets

Before storing a Position preset it is necessary to combine the panels you want to be controlled into a group (see "Fixture Layout" on page 51).

> **Note -** A group can consist of a single panel.

To record a preset:

1. Set the parameters of colour, position or video that you wish to store as a preset and select or deselect the masking controls: C, P and V.

2. Click the red preset record button. The tiles of the available groups will appear with striped diagonal lines.
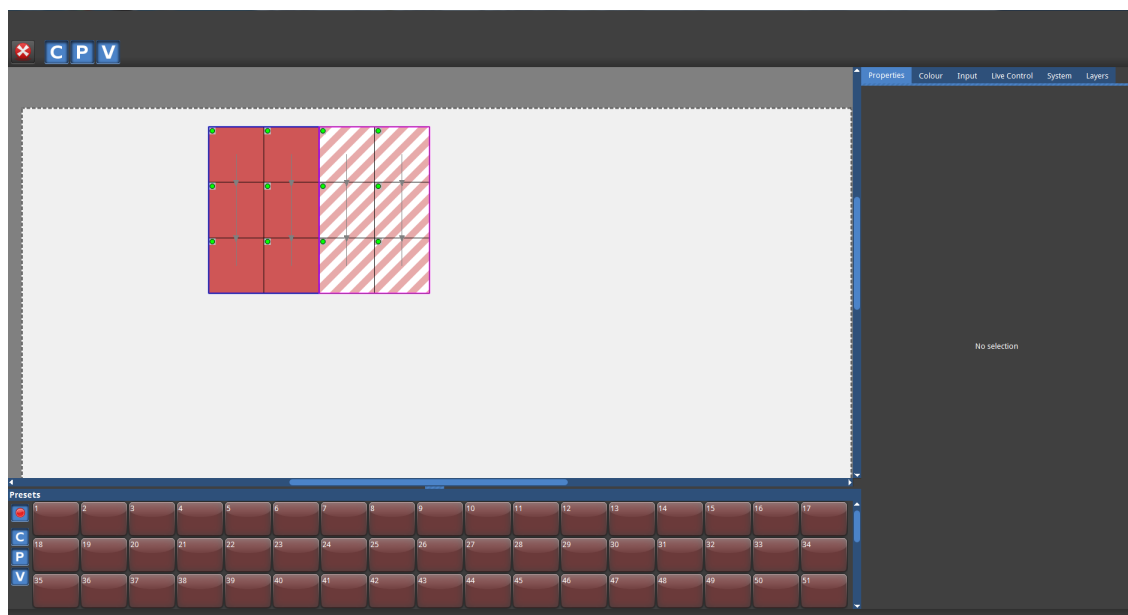
3. Click on the group or groups you wish to select for the preset. Once the group or groups are selected the diagonal lines will change to solid colour. Only the group or groups which are selected will be stored into a Position preset.

4. Click the preset button on which you want the new preset to be stored. The preset can now be recalled whenever needed by clicking on the preset recall button.

Editing Presets

To change any parameters of a stored preset, recall the preset by clicking on the preset recall button, make the alterations and re-record it.

Right-click on a preset recall button to rename or delete it.

Using Presets to Crossfade Between Inputs

Switching inputs can be achieved by creating a Video (V) preset for each input. This is a feature only available on M-Series processors.

To assign crossfade times to these presets right click on each preset and select properties. The properties of each preset will now appear in the properties tab and there is an option here to assign a crossfade time.

Note - The cross fade time does not apply to Colour and Position parameters or any of the other Video parameters except input selection.

Chapter 10 - Live Control

Introduction

Live Control allows users to control and modify the colour, video and position parameters of the processor remotely using the industry standard DMX or Art-Net protocols, or using the Tessera Control application for Windows and Mac OS.

These are parameters which would normally be controlled either by adjusting sliders, selecting options from drop down menus, or in the case of panel position by dragging icons in the graphic user interface (GUI) of the processor or its remote software.

Live Control can provide flexible control of the Tessera system, ranging from using a DMX fader desk controlling a single parameter, to controlling multiple groups across several processors. Live Control can be used to integrate processors into larger control systems and provide reactive control to external factors such as adjusting panel brightness in outdoor environments.

Parameters can be controlled either directly, so their values correspond to a DMX channel(s) or values can be stored into presets and recalled using Live Control.

The following terms defined below will help us to navigate the systems live control functions.

Live Control Tab – Located in the tab bar, the Live Control Tab contains the options used to configure the processor for Live Control.
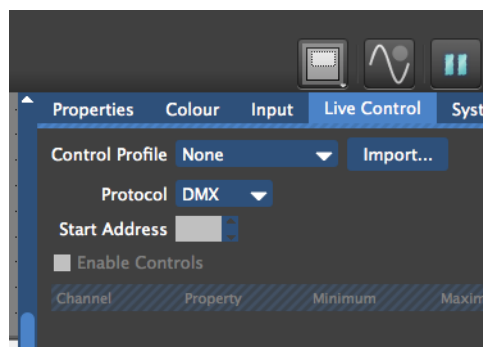
Figure 10-1. Live Control Tab

Processor Parameter – Is any parameter on the processor that can be controlled with Live Control.

Control Profile – A control profile, used for DMX and Art-Net control, contains information about the parameters and assignable items that can be controlled when using that Control Profile and maps these to particular channels. A Control Profile is not required when using the Tessera Control application.
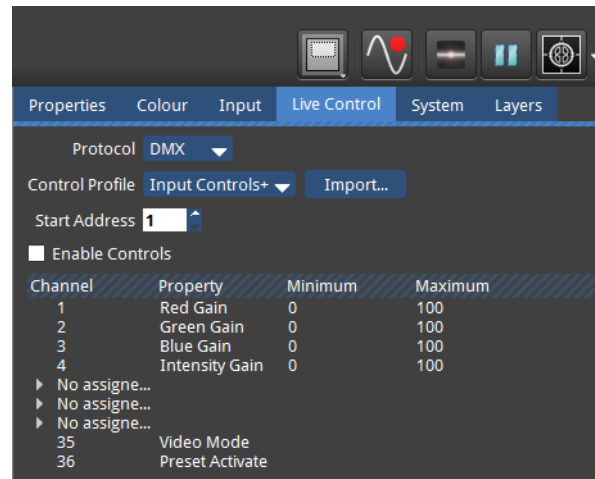

Figure 10-2. Choosing Protocol and Control Profile

Protocol – Denotes the actual Control Protocol which is being used to control the processor. This can be DMX (via the 5 pin XLR input) , Art-Net (via a network connection), or the Tessera Control protocol which allows control of multiple processors from the Tessera Control application.

Configuring the processor for DMX control

1) Connect a source of DMX512 to the opto-isolated XLR 5 pin input.

2) Go to the **Live Control** tab and select DMX from the Control Protocol drop down menu.

3) Enter a **Start Address** for the processor (default 001). The Start Address will correspond with the DMX address of the first parameter in the selected Control Profile.

4) Enable **Live Control** by checking the **Enable** in the Live Control Tab or clicking the Live Control button in the Right Button menu.

If DMX is detected, the Live Control button will light up green to indicate that a source of Live Control has been detected and that Live Control is enabled.

Note: - M2B and T1 processors are fitted with a DMX I/O card which features an opto-isolated DMX in and through. The DMX I/O card is located above the Ethernet I/O card.

M2B processors can be identified by a serial number that starts with 002xxx.

Configuring the processor for Art-Net control

1) Connect an Art-Net source to the Net, Net 1 or Net 2 port on the processor's back panel (either directly or via switch).

2) Go to the **Live Control** tab and select Art-Net from the Control Protocol drop down menu.

3) Ensure that the processor is in an Art-Net compliant IP Address and Subnet. This can be changed in the Setting – Processor menu. Please see "Live Control" on page 92 for more details.

4) Enter a **Start Address** and universe for the processor. The **Start Address** will correspond with the DMX address of the first parameter in the selected Control Profile and the universe will determine which Art-Net universe that the processor will listen to.

5) Enable **Live Control** by checking the box **Enable Controls** in the Live Control Tab or clicking the Live Control button in the Right Button menu.

If the Art-Net is detected, the **Live Control** button will light up green to indicate that a source of Live Control has been detected and that Live Control is enabled.

> **Note -** M2B processors are fitted with a pair of control Ethernet ports, marked Net 1 and Net 2, which share the IP address set in the Settings – Processor menu. This is helpful when you wish to connect a Remote PC or laptop to one port (For local control) and still have an Art-Net input to the processor on the second port. When connecting multiple processors to a single DMX over Ethernet source it is recommended to manage signal distribution with switches rather than using the second port as a thru port. M2B processors can be identified by a serial number that starts with 002xxx.

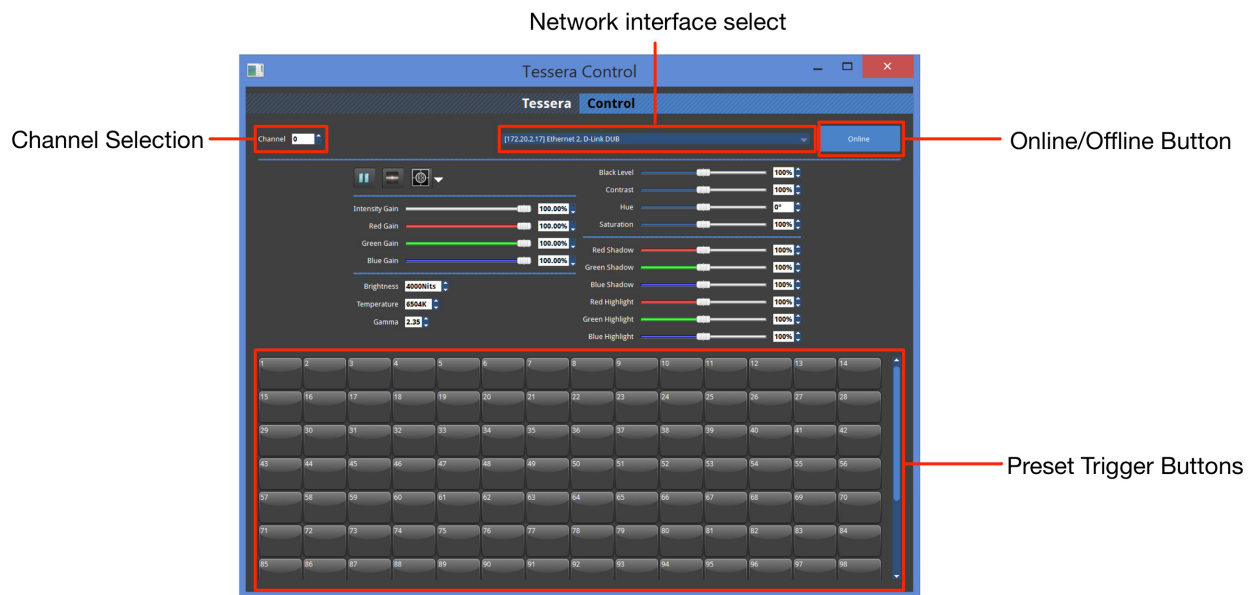# Configuring the processor for control from Tessera Control

Network interface select

Channel Selection

Online/Offline Button

Preset Trigger Buttons

Figure 10-3. Control application GUI

1) Download and install the Tessera Control application on a Windows or Mac computer.

2) Run the application and select the relevant Network Interface from the drop-down.

3) Connect the computer to the Net, Net 1 or Net 2 port on the processor's back panel (either directly or via switch).

4) Go to the **Live Control** tab and select Tessera Control from the Control Protocol drop down menu.

5) Choose a Channel number and set this in both the Tessera Control application and the **Live Control** tab. The Channel number is used to determine which processors are controlled by which instances of the Tessera Control application. By selecting the same Channel number on multiple processors they can be controlled simultaneously from a single instance of the Tessera Control application.
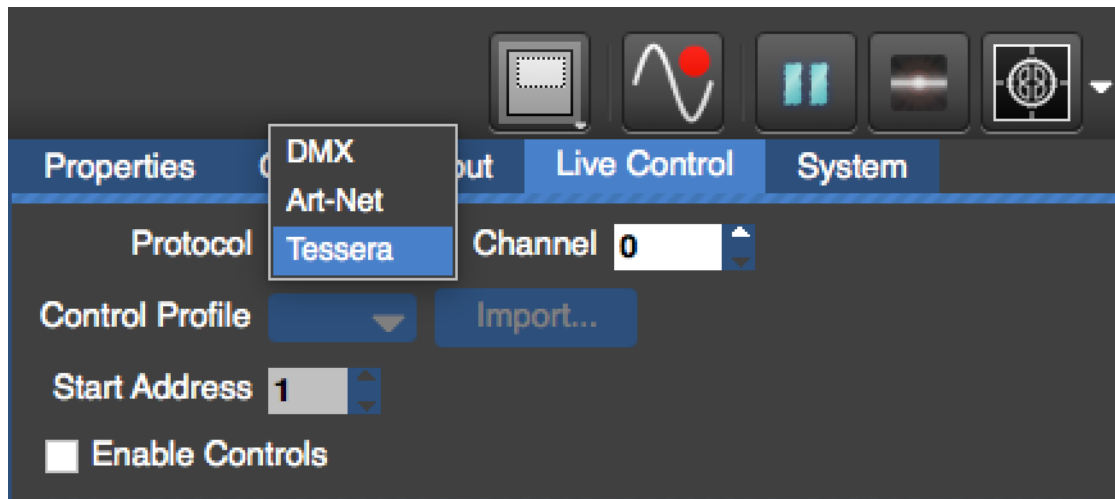
Figure 10-4. Selecting the Tessera control protocol

6) Enable **Live Control** by checking the box **Enable Controls** in the Live Control Tab or clicking the Live Control button in the Right Button menu.

If the computer running Tessera Control is detected, the **Live Control** button will light up green to indicate that a source of Live Control has been detected and that Live Control is enabled.

Enabling Live Control
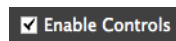
Figure 10-5. Enable Controls checkbox
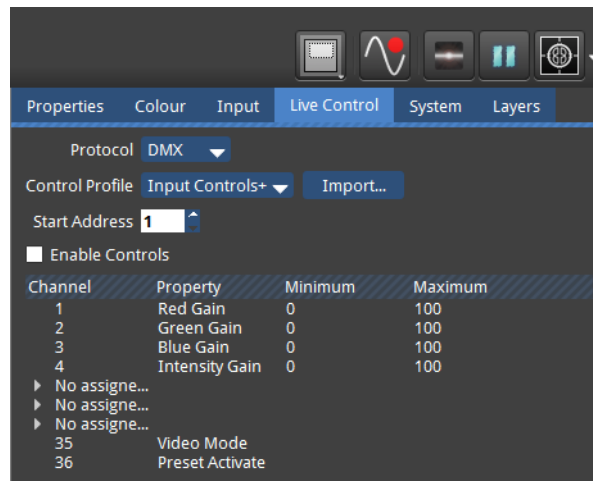
Figure 10-6. Live Control Tab and icon

Live control can be enabled by checking the box marked Enable Controls or by clicking on the live control icon. The icon will appear blue when Live Control is enabled. Once Live Control is enabled any parameters included in a selected Control Profile will go to the value defined by the incoming DMX or Art-Net signal. When Live control is disabled the parameters will return to the value set by the GUI before DMX was enabled.

The Live Control icon indicates the live control status. This can present in 5 different states.

Figure 10-7. Unconfigured

The grey circle indicates no control profile has been chosen and Live Control is disabled. This is the default setting for a new Project File.

Figure 10-8. Configured but disabled and not receiving Signal

A Control Protocol has been chosen and the red circle tells us that no data of the selected protocol is being received. The grey background tells is Live Control is not enabled.

Figure 10-9. Configured and enabled but not receiving Signal

A control profile has been chosen and Live control is now enabled. No valid control protocol signal is being received at this point so the faders will default to either the last valid signal received or the GUI values before Live control was enabled.

Figure 10-10. Configured but disabled and receiving DMX

The system is configured and a valid DMX or Art-Net signal is being received but the parameters will be responding to the GUI (and not the incoming signal) as Live Control is not enabled.

Figure 10-11. Configured, enabled and receiving DMX

Live control is configured and enabled and a valid control signal is being received. The processor parameters included in the selected Live Control Profile will be responding to DMX.

Parameter Indicators

When Live Control is controlling a parameter it will display a red icon next to its GUI control. When Live Control is enabled, controlled parameters will display their current value but cannot be adjusted manually until Live Control is disabled. When a control profile has been configured but Live Control has not been enabled the circle appears transparent.
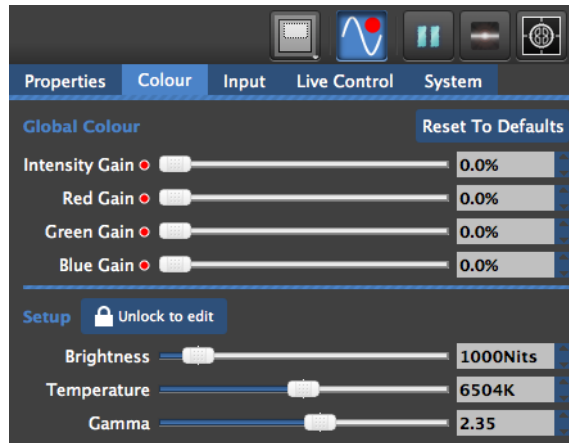
Figure 10-12. Control profile configured with Live Control active
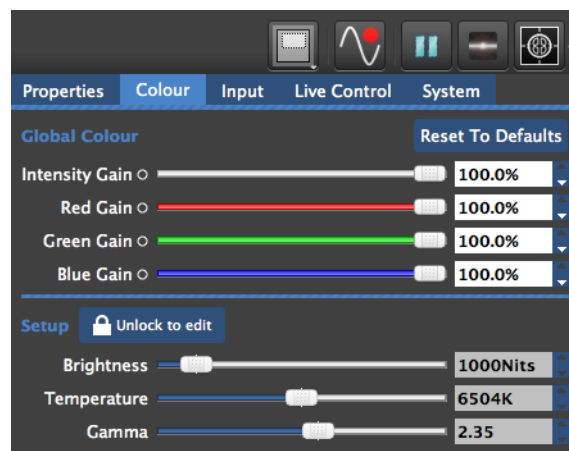
Figure 10-13. Control profile configured and Live Control disabled.

Control Profiles

A selection of Control Profiles that can be used to control various parameters are included in the processor. Control Profiles are used with DMX and Art-Net modes only. These profiles are intended to cover the majority of use cases. However where necessary it is possible to modify and create new Control Profiles to suit a particular application. For details on how to do this please contact support@bromptontech.com.

The default Control Profiles contained in the v1.4 firmware are:

Colour - (28 Channels total if fully assigned)

1x Global control of Red, Green, Blue and Intensity Gain.

6x Group assignable sets of Red, Green, Blue and Intensity Gain controls.

Groups - (60 Channels total if fully assigned)

6x Assignable sets of group position, orientation and Red, Green, Blue and Intensity Gain controls.

Preset Activate (1 Channel)

1x Channel to trigger up to 127 user definable presets.

Input Controls - (30 channels total if fully assigned)

3x Assignable controls of Input Colour management parameters.

Input Controls+ - (36 channels total if fully assigned)

1x Global control of Red, Green, Blue and Intensity Gain.

3x Assignable controls of Input Colour management parameters.

1x Video Mode selection channel.

1x Preset activation channel.

Since some of the sets of parameters that make up these profiles are repeated and some are common to more than 1 profile it is possible to control all the profiles with 5 suggested DMX libraries (See section x.xx). For an up to date breakdown of the channel assignments of the stock profiles and suggested console library files to control them please refer to the latest DMX Profiles Listing which can be downloaded from the support page of the Brompton web site:

www.bromptontech.com/support

Assign controls to a Group or Input

Some Control Profiles that contain multiple sets of group or input controls allow users the ability to assign each set of controls to a single group (of fixtures) or input (DVI or SDI).

This control is in the form of a drop down menu for each set in the Channel column. When a new profile is selected all user assignable sets will have the legend "No assigned group" or in the case of input controls "No assigned video input".

For Fixture Groups

Clicking on this legend will reveal a drop down menu showing all the available fixture groups that have been created in that project file. Please note if no fixture Groups have been created the Menu will have only one option "None" but once fixture groups have been created and or named they will appear below in the order in which they were created.

Figure 10-14. Configuring Fixtures

Figure 10-15. Configuring Fixture Groups

In the illustration above the example project includes 4 fixture groups that have been renamed to describe the screens they control. The user can then assign each screen to set of DMX channels and parameters that are controllable their DMX or Art Net control device.

For Input Control

On M2 processors clicking on the legend will reveal a drop down menu consisting of None and the three inputs: DVI SDA-A and SDI-B. Using these controls any one input can be assigned to any particular bank of 10 channels.

Figure 10-16. Configuring selected input parameters

The illustrations above show the drop down menu that will appear when you click on the unassigned parameters. The + symbol will expand the selection to show all the parameters being controlled by that bank of channels.

Minimum and Maximum Values

Minimum and Maximum values are contained within Control Profiles that set the range of parameter values that can be achieved when controlled with Live Control. This includes being able to set lower and upper limits.

This is useful in situations where it may be important to limit the lower or higher values of a parameter. An example would be limiting the Intensity gain of a processor to prevent panels being set to a brightness level that is undesirable.

When Live Control is used to control a parameter, the parameter will be limited between the minimum and maximum values, with the DMX channel used to control the parameter being scaled between the two values.

Default Values

When working with parameters such as group position, it is important to note that the location and orientation of the assigned group on the canvas when Live Control was enabled will be treated as its default location. Minimum and maximum values will be applied from the initial position on the canvas. If Live Control is disabled and the assigned group is subsequently moved on the canvas and Live Control is re-enabled, the new position of the assigned group on the canvas will be used as it's default position and the minimum and maximum values will be applied from there. This means that stored presets that place the group in one position on the canvas may now move it to a different position. So for consistent positioning in live control it is best not to move the position of groups once live control programming has begun.

It is possible to lock a single parameter on the processor to a value by setting both the minimum and maximum value to the value you would like to lock the parameter too. This would prevent Live Control from changing the value of this channel whilst allowing changes to be made to other parameters that are part of that Live Control profile.

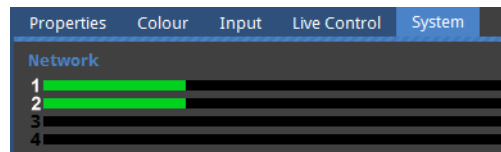# Chapter 11 - System Management

Network Load

Figure 11-1. The Network Load bars

The network section of the Systems Tab is a graphical representation of the network load on each Tessera Protocol output. The greater the network load on an output, the further to the right the green bar will be. The processor will warn you if an output is becoming too heavily loaded. If this happens then you should consider moving some fixtures to another output or decreasing the network bit depth. When there is an Ethernet link the appropriate output number next to each bar will be highlighted in white, as in the above picture.

For further details on how network load is calculated, see "Output Capacity" on page 28.

Network Bit Depth
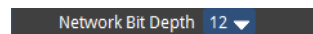
Figure 11-2. The Network Bit Depth drop-down menu

Network bit depth refers to the bit depth at which video data is encapsulated and packetised and sent to connected fixtures. This does not refer to the bit depth at which the front-side processing occurs at, which is always 12 bit, and does not refer to the bit depth at which processing occurs in , which always happens at 16 bit.

By default, the network bit depth is 12 bit, but can be altered to 8 bit or 10 bit. Lowering the network bit depth can allow more panels to be attached to the processor, however this should used with care. The network bit depth should always be equal or better than the bit depth of the input source. For example, DVI is 8 bit and SDI is 10 bit. Reducing the bit depth can reduce the overall visible image quality, depending on the source, and adjustment of parameters such as RGB gain or brightness and contrast.

The selected network bit depth affects the capacity of each Tessera output port. See "Output Capacity" on page 28 for more details.
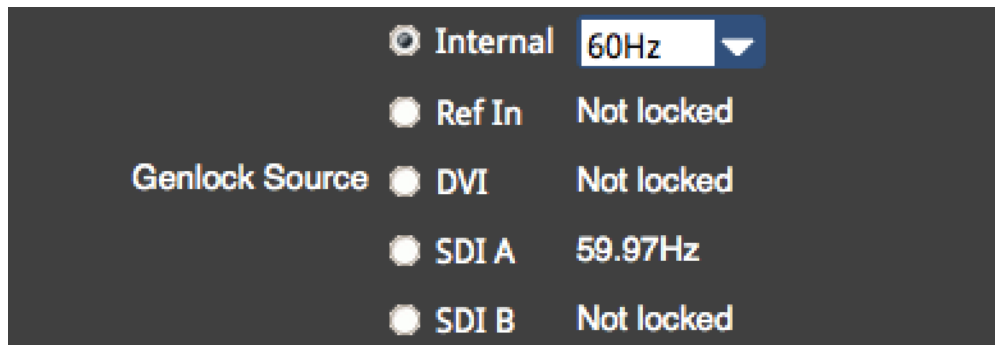
Genlock Settings

Figure 11-3. Genlock Settings

Internal

The internal setting allows an overall refresh rate for the processor to work at, which can be 23.98, 24, 25, 29.97, 30, 50, 59.94 and 60 fps, irrespective of the frame rate of sources coming in to the processor. The processor will automatically compensate where the source frame rate and the internal refresh rate are different

Reference In

The M Series processor can synchronise its system and panel refresh to an external bi-level or tri-level reference. The processor will automatically compensate for sources that do not match the refresh rate of the external reference.

Locking to Video Inputs

Tessera processors can lock the processors internal refresh and fixture refresh to the refresh rate of an incoming source, whether it be on the DVI-I input, or in the case of the M series processor additionally on either of the two SDI inputs. The processor will automatically compensate for sources that do not match the refresh rate of the selected source.

The selected genlock frame rate affects the capacity of each Tessera output port. See "Output Capacity" on page 28 for more details.

> **Note -** If the frame rate of the incoming video input is different to the reference, be it internal, another video input or a bi-level or tri-level sync, then the processor will match the referenced frame rate by either doubling frames or dropping frames depending on whether the incoming frame rate is less than or greater than the reference frame rate. There is no guarantee that every processor will do this at the same time. For critical synchronisation between two or more processors then the incoming frame rate should match the referenced frame rate.

Additional Video Delay

Figure 11-4. Additional Video Delay

Additional video delay allows the output refresh to be delayed by up to 5 frames. This allows Tessera processors to match the latency present in other display systems.

Custom Test Patterns

It is possible to import a bitmap to use as custom test pattern. To use the custom test pattern select the test pattern button on the main canvas window and select Custom Test Pattern from the drop down menu. Tessera supports a maximum 8MB file size and supports .jpg, .PNG, .bmp and TIFF formats at up to 1920 x 1080.

Low Latency Mode

Low Latency Mode bypasses the following of Tessera's front-side processing functions: de-interlacing, scaling (upscaling and downscaling), active area, and frame-rate conversion. This reduces the overall latency by one frame. Colour functions, such as contrast, brightness and RGB gain remain unaffected. The input source comes in at it's particular resolution and sync frequency and is positioned 1:1 in the top left corner of the canvas.

NB the processor does not support interlaced video sources in Low Latency Mode.

S-series processors are always in low latency mode, and non-standard canvas sizes switch the processor into low latency mode.

The frame rate of the processor is determined by source frame rate, and what the internal or external reference might be set to.

Typical Latency

The typical latency of the Tessera processors from input to panel refresh for progressive sources is as follows:

Fixtures using constant current LED drivers and using generic constant current drivers: 2 frames.

Fixtures using PWM LED drivers: 3 frames.

For interlaced sources the latency is 2 fields for constant current fixtures and 3 fields for PWM driver fixtures.

When fixtures that use constant current drivers are mixed with PWM fixtures then the processor adds a frame of latency on to the constant current driver fixtures to match the latency of the PWM fixtures.

Note - We define latency (video delay) as time between the last cycle of a source frame appearing on the processor's input, and the first cycle that an LED on a fixture is lit with that frame.

S4 Settings
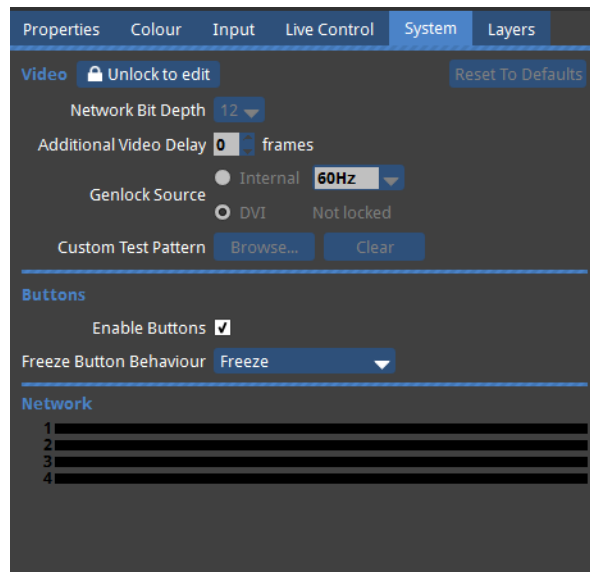
Figure 11-5. S4 Settings Tab

The S4 processor's Settings Tab looks slightly different to that of the M2 or T1, as there are additional options for configuring the S4's front panel buttons.

The Freeze button can be customised to show a custom test pattern/bitmap instead of it's Freeze function. To do this, select Test Pattern from the Freeze Button Behaviour drop-down menu. See "Test Patterns" on page 112 for more information.

The front panel buttons can be disabled by unchecking the Enable Buttons checkbox.

See "Freeze and Blackout" on page 114 for more information about the S4 front-panel buttons.

Chapter 12 - Diagnostics and Test

Online Panels

The *Online Panels* window provides comprehensive information about all fixtures currently detected on the Tessera Outputs. It can be accessed from the *Tools* menu.

Exporting Online Panels data

The data in the Online Panels window can be exported by clicking the *Export Data* button. The data exported will match that which is currently visible, so the selected filter options, column hiding and sorting will all apply to the exported data.

Data will be exported in Comma-Separated Values (CSV) format, which can be opened by many spreadsheet applications such as Microsoft Excel, or in a simple text editor

Device Properties

Device Properties displays the selected fixture's device properties in the Properties Tab. These include the fixture's MAC address, serial number and firmware version.

Figure 12-1. Device Properties

Beacon

The Beacon button highlights selected fixtures by using the Identify test pattern which features a white border with a dark blue on each of the selected fixtures. The status LEDs will also flash on the back of the selected fixtures.
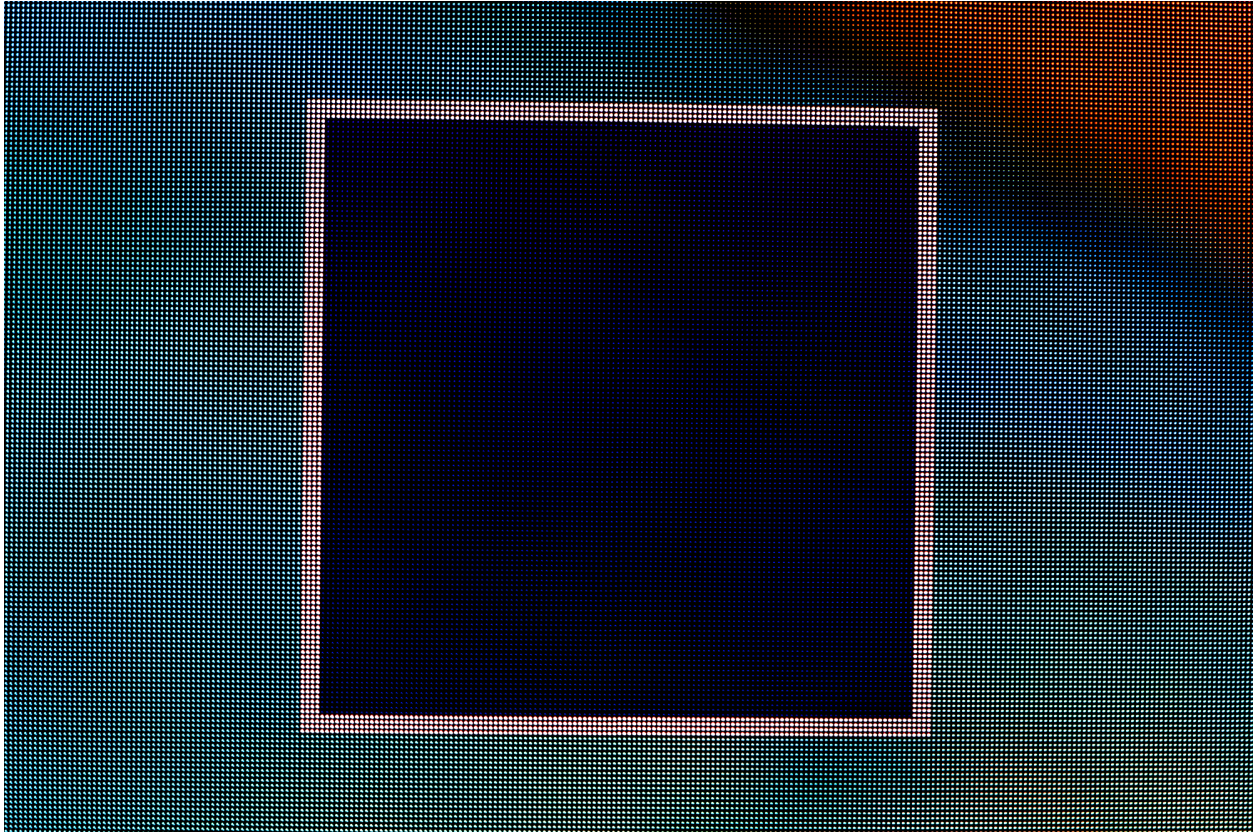
Figure 12-2. A Beaconed panel showing the Identify internal test pattern.

Reset

Reset allows the selected fixtures to be reset

Reload Firmware for Selected Panels

This allows firmware to be uploaded for selected fixtures.

Test Pattern

The Test Pattern drop-down menu allows you to select a range of internal test patterns that are generated on the fixtures themselves. These patterns are particularly useful for testing a range of fixture and fixture module based issues.
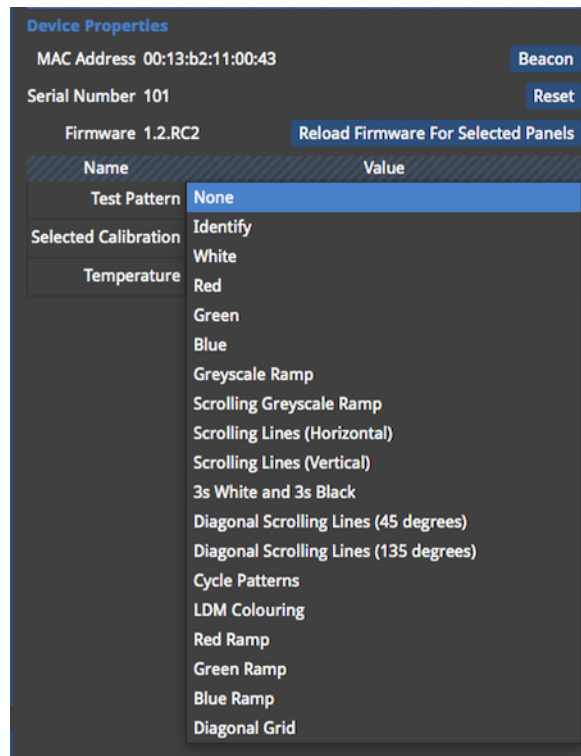
Figure 12-3. Internal Test Pattern drop-down menu.

On some fixtures it is also possible to trigger these test patterns using a self test button on the back of the tile (refer to fixture manufacturer documentation for specific functionality).

Selected Calibration

The Selected Calibration drop-down menu allows the selection of different colour calibration profiles that might be stored in a fixture. The amount of different colour calibrations available is dependent on how much flash memory available for calibrations on the fixture.
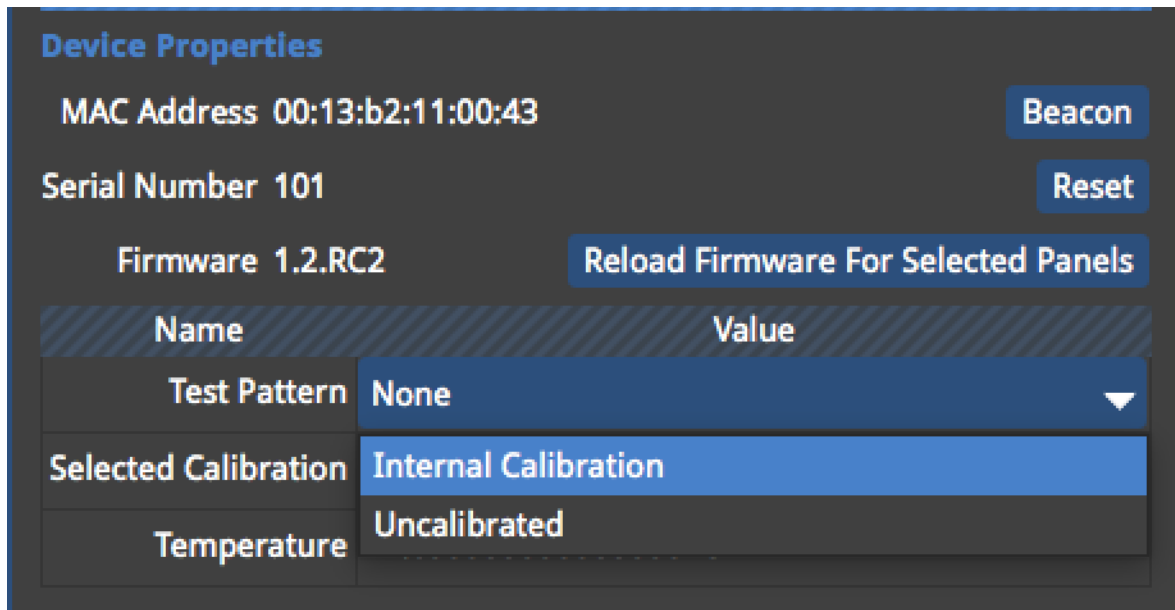
Figure 12-4. Selecting between the internal calibration and uncalibrated.

Test Patterns

Processor Test Patterns

The Tessera processor has a selection of built-in test patterns. These can be used to verify the correct performance of the fixtures and also to verify that a finished layout of fixtures are in the correct arrangement.

Scrolling/moving test patterns will always move exactly one pixel horizontally and/or vertically per frame (at the genlocked frame rate). Therefore the motion should be perfectly smooth. Any juddering, double/dropped frames or tearing between fixtures would indicate issues on the network or within individual fixtures.

To activate test patterns click on the test pattern button in the right hand corner of the main project window.
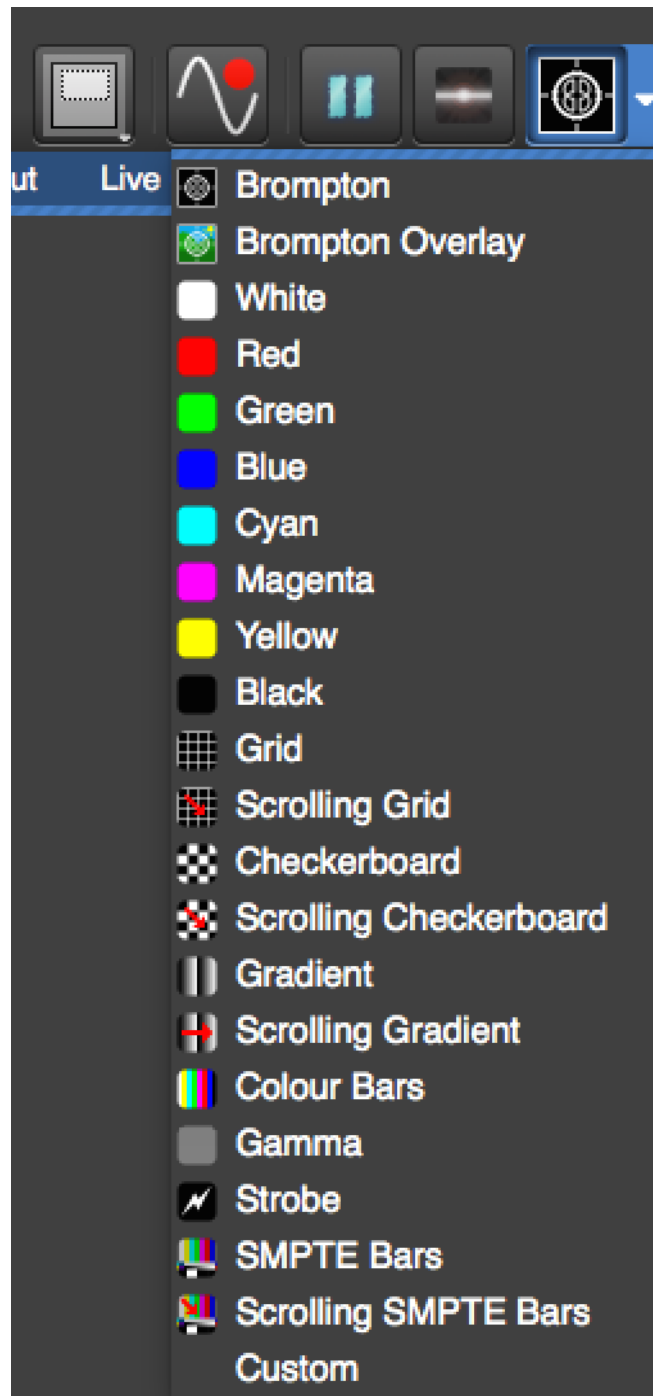
*Figure 12-5. Test Pattern button with associated drop-down menu
that allows the selection of the relevant test pattern*

To turn off test patterns click on the icon again and it will turn grey.

To change test pattern click on the small white triangle to the right of the icon and it will give a selection of test patterns as shown in figure X.

Custom Test Patterns allows custom test pattern bitmaps to be loaded into the processor. The custom test pattern image can be chosen for each project in the System tab. See "Custom Test Patterns" on page 106

Fixture Test Patterns

In addition to the processor test patterns it is possible to trigger test patterns on individual fixtures or groups of fixtures by selecting them in the canvas. See "Device Properties" on page 109 for more details

Freeze and Blackout

Pressing the freeze button will pause the incoming video signal and hold the final frame indefinitely. Pressing the freeze button again will resume live video.

Pressing the blackout will cause all panels to go black. Pressing the button again will resume live video.

S4 front panel buttons

The S4 features 2 buttons on the front panel to control freeze and blackout. By default these perform the same functions as the buttons in the GUI. The buttons illuminate red when they are activated.
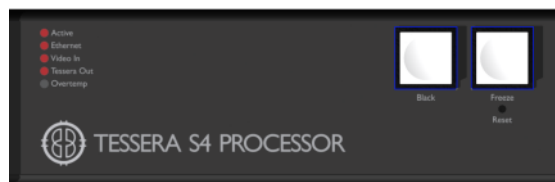
Figure 12-6. S4 buttons on the front panel

The front panel buttons can be disabled on a per-project basis. The Freeze button can also be customised to show a custom test pattern/ bitmap instead of it's Freeze function. See "S4 Settings" on page 108 for information on setting these options.

Chapter 13 - On-Screen Colour Adjustment

On-Screen Colour Adjustment (OSCA)

Tessera processors feature comprehensive fixture-based seam adjustment for fixture and module seams and 7 way colour correction for modules and panels.

High pixel pitch fixtures require absolute mechanical precision when connecting to adjacent panels. However, due to mechanical design tolerances many higher pixel pitch fixtures have issues lining up precisely with adjacent fixtures, or can even have slight mechanical misalignment issues between the LED modules that make up the fixture. This can give rise to the appearance of perceived bright or dark lines at the seams of fixtures or modules. This can be particularly noticeable when viewing certain kinds of content or solid colours, and appears as bright or dark seams between adjacent panels. One technique to help ameliorate this is to adjust the luminance of the pixels at fixtures' seams, either on a fixture basis, if there is an issue between adjacent panels or on a module basis, if there is an issue between adjacent modules within an LED fixture. OSCA provides the user with an easy and comprehensive method of quickly resolving difference in seam luminance between a groups of fixtures and, if necessary, the modules that make up the fixtures.

Occasionally when using different batches of the same LED fixtures together, the LEDs may have aged differently, or the fixtures may have slightly different calibrations. OSCA allows comprehensive colour correction to quickly match fixtures which appear to have slightly different colours or brightnesses.

Note: OSCA is a fixture based adjustment and OSCA values are stored in the fixture. This means the adjustments travel with the panels themselves, so if a LED wall is re-assembled from fixtures in a different order, the OSCA adjustments can be used with the new fixture order. NB OSCA adjustments do not overwrite existing fixture colour calibrations.

> **Note - OSCA** is called on-screen colour correction because when the processor is in OSCA Mode it uses a special user interface that appears on fixtures themselves, highlighting selected fixture or module seams, fixtures or modules making it quick and intuitive to make adjustments on several fixtures.

Putting the processor into OSCA Mode can be achieved either the Tools drop-down Menu in the Main Project Screen, or by using the keyboard shortcut `Ctrl+Shift+O`.
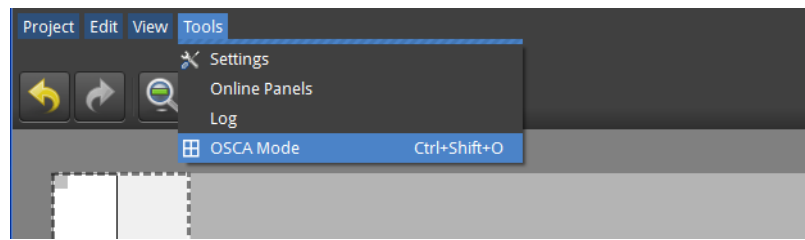
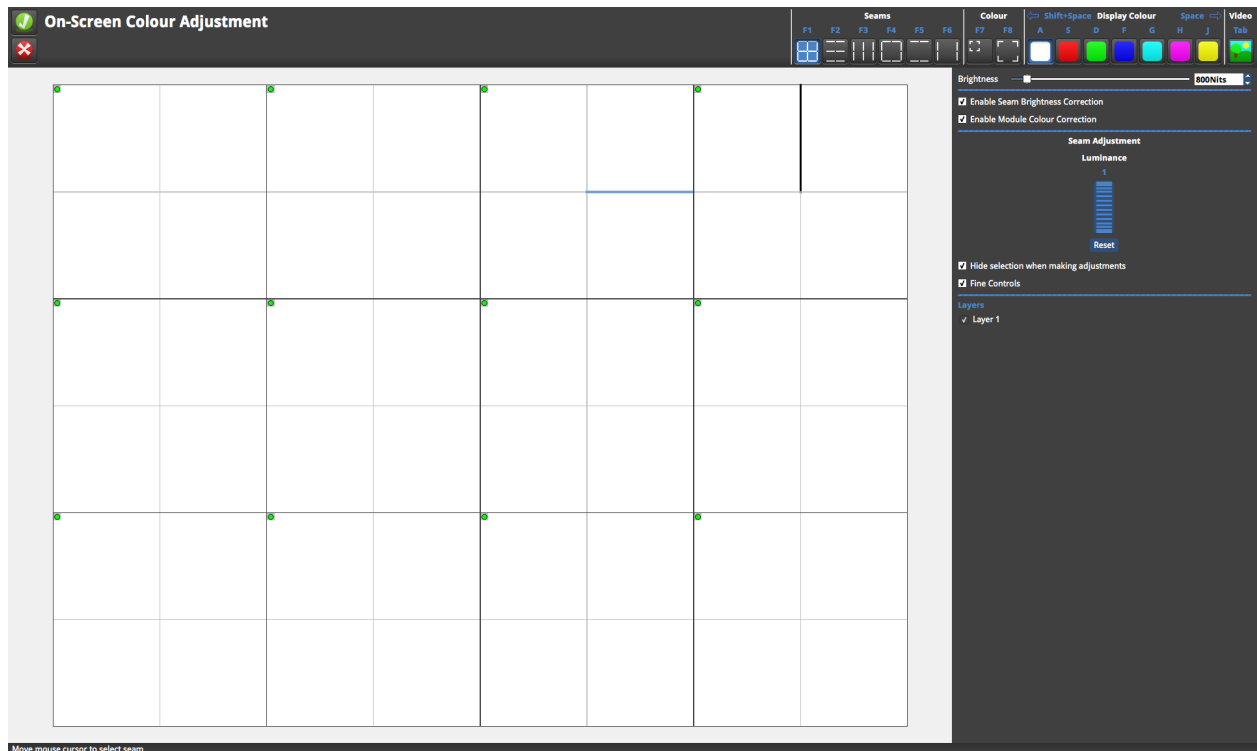*Figure 13-1. Putting the processor into OSCA Mode via the Tools menu.*

Putting the processor into OSCA Mode will disable the video output.
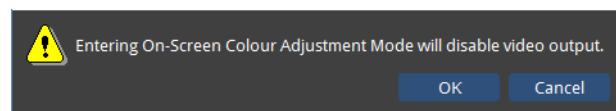
Figure 13-2. The disable video output warning

OSCA adjustments are performed in the On-Screen Colour Adjustment window.

Figure 13-3. The On-Screen Colour Adjustment window

The On-Screen Colour Adjustment window displays the fixtures in the project as they are positioned on the canvas and has a toolbar that is particular to fixture colour and luminance adjustments.

Fixtures can be selected the same way as on the Project Screen. Layers can be particularly helpful with selecting panels for OSCA adjustment. Please see "Layers" on page 62 for more details.

Putting the processor into OSCA mode outputs a solid colour on the connected fixtures. By default this will be white. However it is possible to display each of the primary colours (red, green and blue) or secondary colours (cyan, magenta, and yellow).

Display Colour

Changing the colour displayed on the fixtures can help to assess differences in seam luminance, or colour variances between fixtures. Changing the colour can be done either by selecting the colour from the OSCA toolbar, using it's keyboard shortcut, or by using `Space` or `Ctrl-Space` to cycle through the different colours.

Figure 13-4. The Display Colour section of the OSCA toolbar

Display Video

Video can be displayed temporarily in OSCA Mode by pressing the Video icon on the OSCA toolbar, or by holding the `Tab` key down. The video displayed will be whatever the processor was displaying before it was put into OSCA Mode.
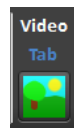
Figure 13-5. The Display Video icon on the OSCA toolbar

OSCA works in one of two modes: Seam Adjustment, which allows the luminance adjustment of fixtures and fixture modules, or Colour Adjustment which allows colour adjustment of fixtures or fixture modules.

Seam Adjustment

Seam adjustments allow the correction of luminance at the seams at the edges of fixtures or between adjacent modules within fixtures.

OSCA allows to select fixture or module seams in several different methods. The different seam selection methods can either be selected by clicking on the relevant seam selection method in the Seams selection of the OSCA toolbar, or by hitting F1 to F6.

Multiple seams can be selected according to the different selection methods by marquee selecting the different fixtures or modules or `Ctrl-click.`
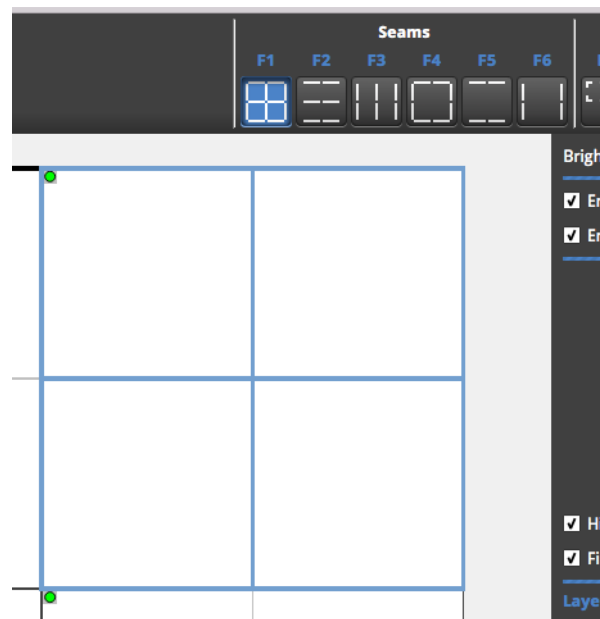
Figure 13-6. Different seam selection methods

When seams are selected on the OSCA canvas view, the relevant seams are highlighted on the fixtures themselves, together with a cursor, relating to the position of the cursor on the OSCA canvas.
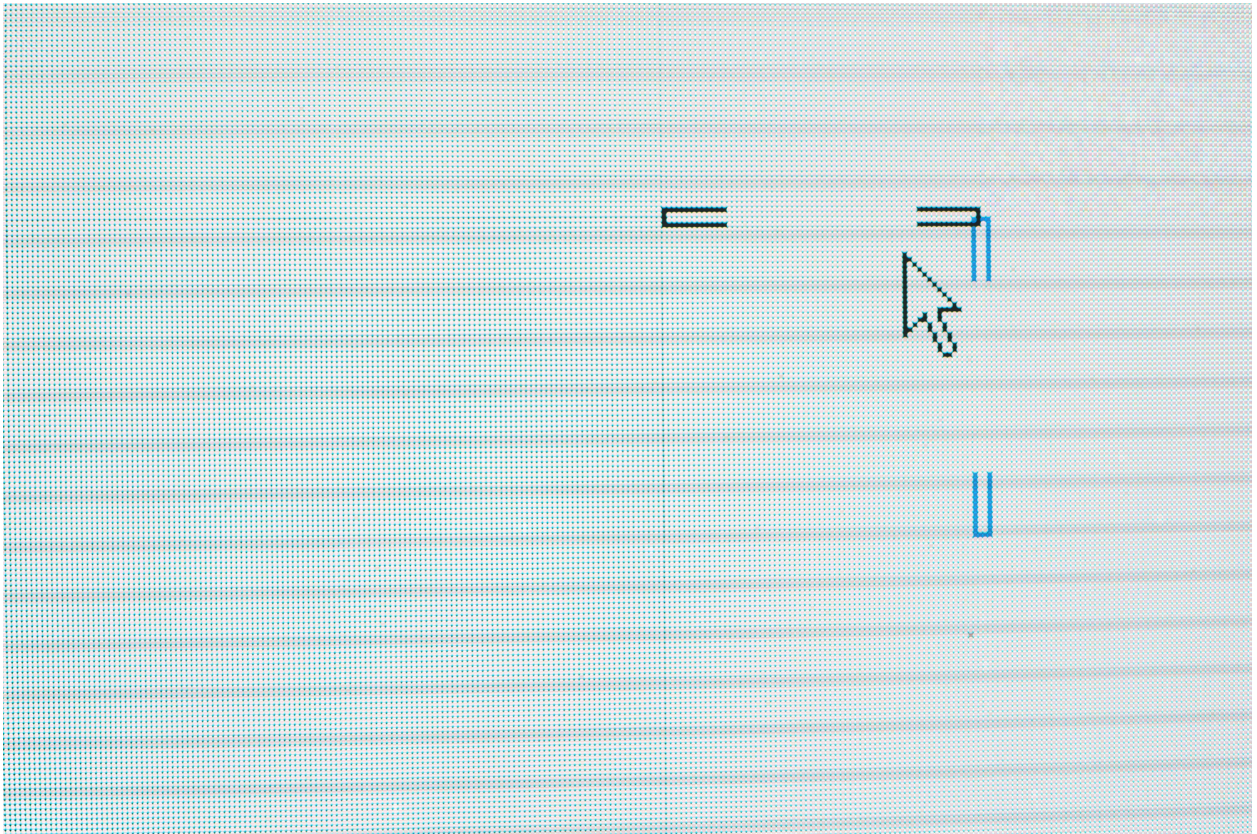
Figure 13-7. OSCA on fixtures showing selected seams and cursor

Once the desired seams have been selected then the luminance can be adjusted by clicking and dragging up or down on the Seam Adjustment Luminance thumbwheel. You can also hover the mouse pointer over the Luminance thumbwheel and use the scroll wheel on your mouse.

You can also use the keyboard to control luminance by holding down 1 and using + or − to increase or decrease the luminance. Holding down `Ctrl-1` gives fine control of luminance.
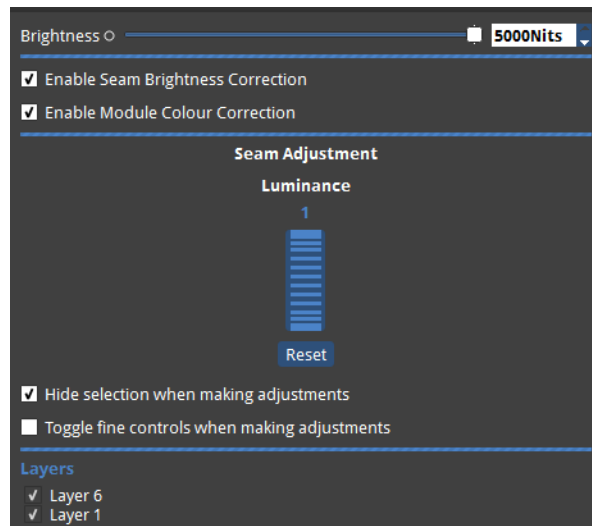
Figure 13-8. Seam Brightness Correction panel.

The Seam Brightness Control panel features Layer selection. See "Layers" on page 62 for more information on Layers. Displayed Layers have a tick along side them. To 'hide' layers then click on the tickbox to untick the box on layers you wish to hide. Hidden layers do not output OSCA Mode.

There is a Brightness slider and spin-box to allow the overall selected fixture or module brightness to be adjusted. Toggling fine controls allows the fine control of luminance to be used in preference to the default course control. This means the `Ctrl` key does not have to be held down to use fine mode.

The Reset button under the Luminance thumbwheel allows the original luminance value to be restored.

The Enable Seam Brightness Correction and Module Colour Correction tickboxes allow these features to be switched on or off.

Colour Adjustment

Colour Adjustment allows powerful 7 way colour correction of fixtures or fixture modules, but with a quick and intuitive user interface.

To access Colour Adjustment of fixtures then select the Fixture icon on the OSCA toolbar or press F8, and to adjust modules select the Modules icon on the OSCA toolbar or press F7

*Figure 13-9. Icons for selecting module or fixture Colour Adjust-
ment on the OSCA toolbar*

Selecting Fixture or Module for Colour Adjustment allows colour correction on a fixture basis or on a module basis. The canvas will allow the selection of fixtures or modules respectively:
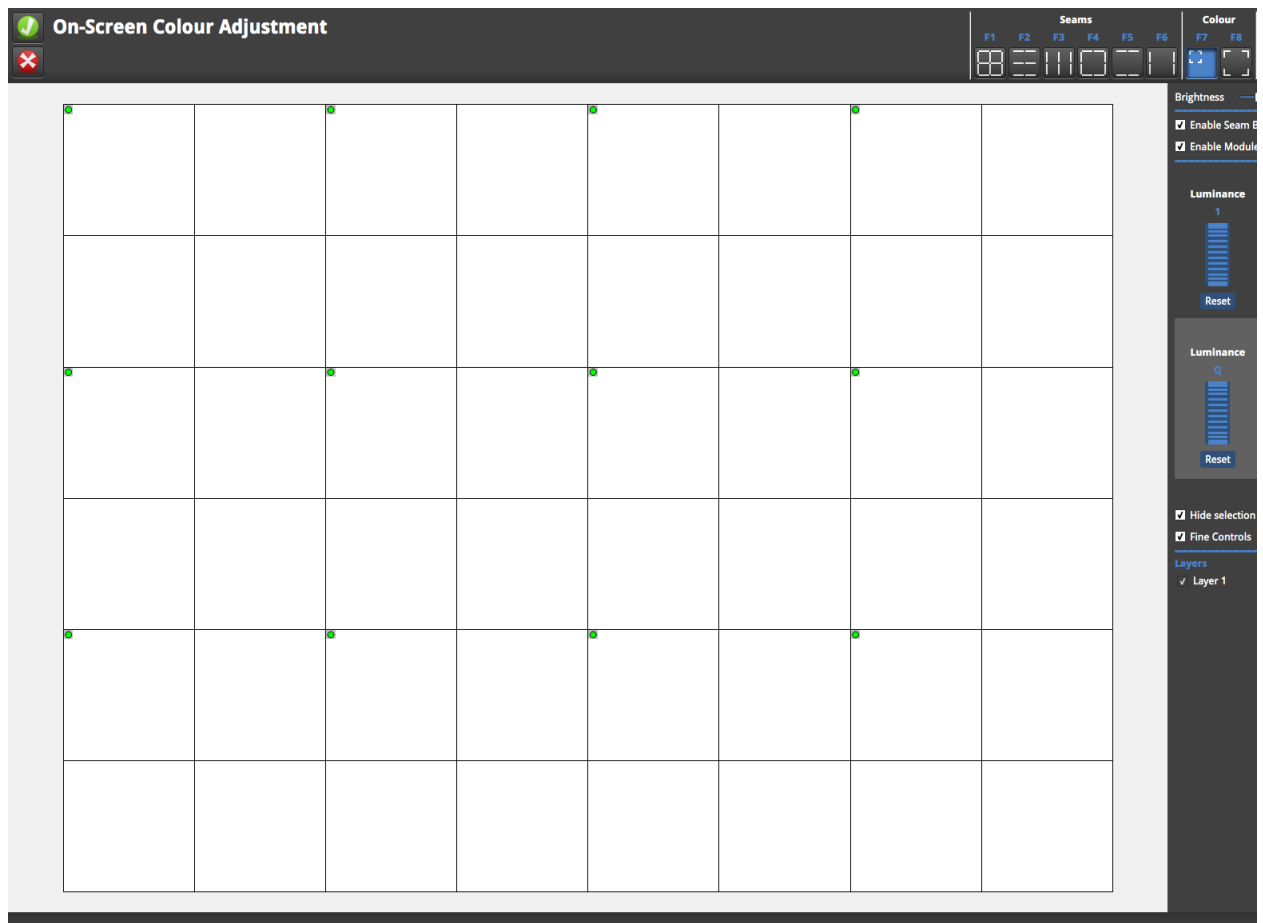
*Figure 13-10. The canvas showing module selection mode for Col-
our Adjustment*

Figure 13-11. The canvas in fixture selection mode for Colour Adjustment

Modules or fixtures can be selected in the usual manner, depending on whether you have Module or Fixture Colour Adjustment selected. When the required fixtures or modules have been selected, the Colour Adjustment panel is displayed. The Colour Adjustment panel is similar in nature to the Seam Brightness Control panel. By using the different Display Colours 7 way colour correction can be accessed.
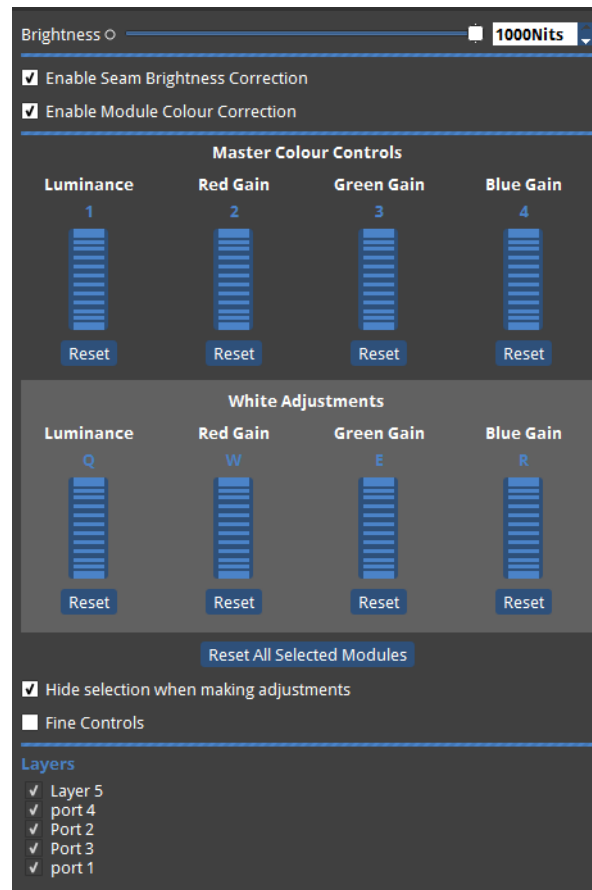
Figure 13-12. The Colour Adjustment panel showing Master Colour Controls and White Adjustments

The Colour Adjustment panel features Master Colour Controls: Luminance, Red Gain, Green Gain and Blue Gain. These give an overall level of colour control. In a similar fashion to adjusting Seam Luminance values, these values can be changed in a few different ways: moving the mouse pointer over to the required parameter thumbwheel and clicking and dragging up and down, or clicking and using the scroll wheel, or by using the keyboard shortcuts. The keyboard shortcuts are displayed above each paramater: 1 allows Luminance to be adjusted, 2 Red Gain, 3 Green Gain and 4 Blue Gain. These can be used in conjuction with the - and + keys to decrease and increase values. 1, 2, 3, 4 can be used together Ctrl for fine control.

By using the the Display Colour controls Colour Adjustments can be made to white and primary and secondary colours. NB The controls only adjust the colour of the test pattern being used.

Selecting White from Display Colours allows Luminance, Red, Green and Blue Gain to be adjusted for white. These can be adjusted using the mouse and scroll wheel in much the same way as before. The keyboard shortcuts for adjusting the white Luminance, Red, Green

and Blue Gain are Q, W, E and R respectively. The value of these can be decreased and increased by using the − and + keys, and using the $Ctrl$ key together with Q, W, E and R
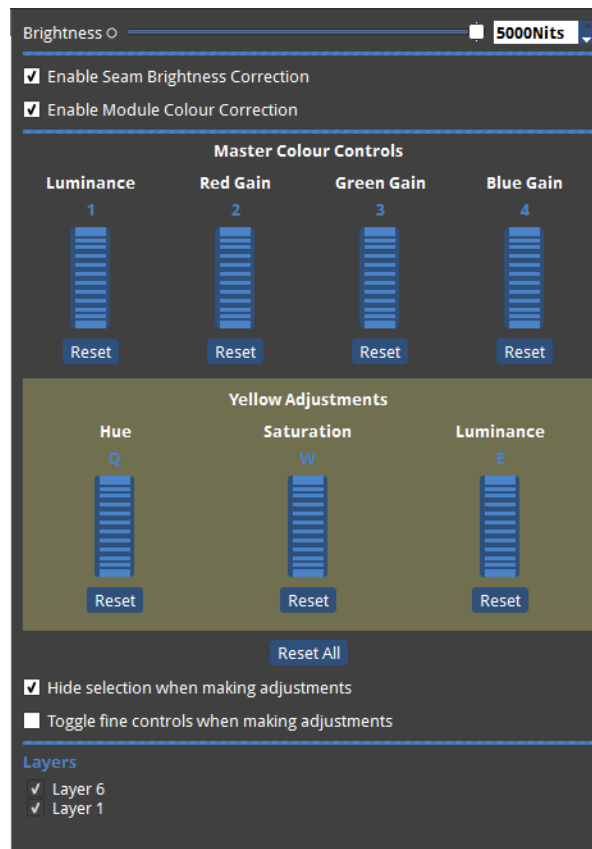
Figure 13-13. Yellow Adjustments

Selecting red, green, blue, cyan, magenta or yellow from Display Colour allows Hue, Saturation and Luminance to be adjusted for each respective colour. The Hue, Saturation and Luminance can be adjusted in much the same way as above. The keyboard shortcuts for Hue, Saturation and Luminance are Q, W and E respectively.

All these adjustments can be reset back to their defaults by pressing their individual **Reset** button.

Hide Selection tick box hides the selection on the fixtures.
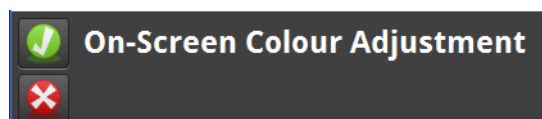
Figure 13-14. Confirm or Cancel buttons

When the seams, fixtures or modules have been colour corrected sufficiently, then selecting the Green tick above will confirm and store the OSCA settings. Please note this can not be Undone. Pressing the Cancel button will cancel the OSCA settings. Pressing either the Confirm or Cancel buttons will return the user to normal operation.

OSCA Keyboard Shortcuts

General OSCA Shortcuts

`F1 - F6`	Seam selection mode
`F7`	Module Colour Adjustment
`F8`	Fixture Colour Adjustment
`A`	Display white
`S`	Display Red
`D`	Display Green
`F`	Display Blue
`G`	Display Cyan
`H`	Display Magenta
`J`	Display Yellow
`Tab`	Display Video
`Space`	Change Display Colour forwards
`Ctrl+Space`	Change Display Colour backwards

OSCA Colour and Luminace Adjustments

`1`	Luminance Adjustment
`2`	Red Gain
`3`	Green Gain
`4`	Blue Gain
`Click+Scroll Wheel`	increase/ decrease parameter
`-`	Decrease parameter
`+`	Increase parameter
`Ctrl+ parameter shortcut`	Fine Adjustment

White Adjustment

`Q`	Luminance Adjustment
`W`	Red Gain
`E`	Green Gain
`R`	Blue Gain

Red, Green, Blue, Cyan, Magenta and Yellow Adjustment

Q   Hue Adjustment

W   Saturation Adjustment

E   Luminance Adjustment

Chapter 14 - Processor Settings

From the Main Project Screen it is possible to set a number of user definable settings for the processor. In the Main Project Screen choose **Settings** from the Tools menu.
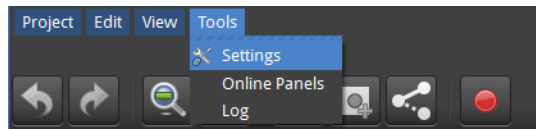
Figure 14-1. Tools dropdown menu

Processor Settings

Figure 14-2. Processor Settings

Identification

It is possible to change the name of the processor as it appears when you connect to it remotely. This can be particularly useful when building a system that uses multiple processors. If no name is set the processor will be displayed by its serial number in the Discovered Processors list in Tessera Remote.

Network Settings

The default IP address of a Tessera processors is 192.168.0.50 with subnet mask of 255.255.255.0.

In addition to being able to set the processor to different static addresses and ranges it is also possible to set processors to receive an IP address from a DHCP server.

The gateway field allows you to add the IP address of a network gateway such as a router.

When using more than one processor on the same network it is recommended to use the processors on different IP addresses within the same IP range.

Logging

The processor can log its actions in a file which can be viewed from the Tools menu in the Main Project Screen. This information can be useful when trying to track what was happening directly before a fault or crash.

It is possible to set the level of detail logged by the processor in this menu ranging from Critical (lowest) to Debug (highest). A high level of detail may reveal more of what the processor was doing at a given moment, however it may make it more difficult to find the salient information.

Syslog

This feature is not implemented yet.

Enable Watchdog

The watchdog is an hardware level process separate from the main processor which monitors the processor and restarts it if it stops responding, even in the event of a complete processor crash . With the watchdog disabled the processor will remain in this state until it is manually rebooted. This may be desirable sometimes when you are trying find the reason for an issue, but generally it is preferable to have the watchdog enabled. This is the default setting.
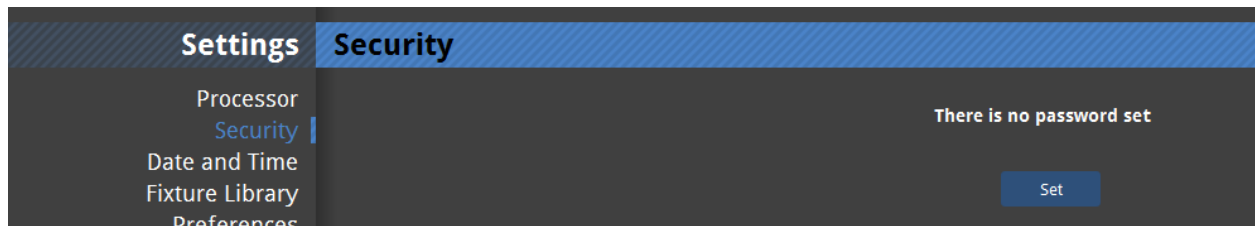
Security

Figure 14-3. Security settings with no password set- the default setting.
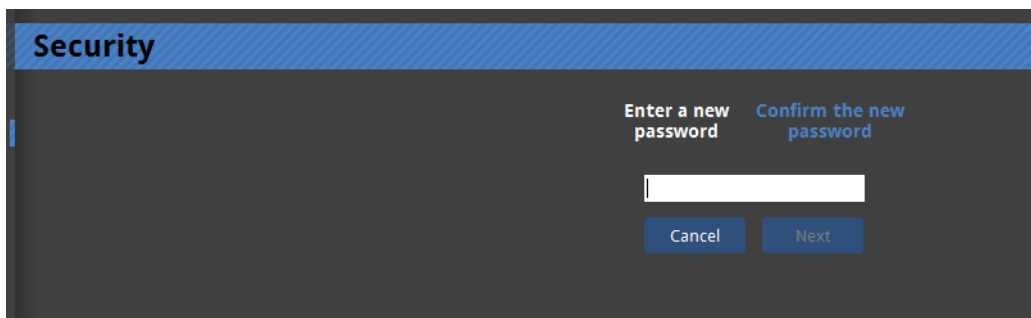

Figure 14-4. Setting a password

It is possible to set a password for the processor. This password will then be requested from users connecting to the processor from the Tessera Remote application. The password is reset if factory settings are restored or it can be removed by re-entering the password in this window.
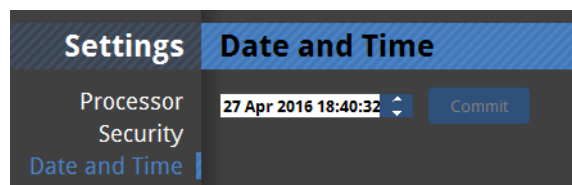
Date and Time

Figure 14-5.

It is possible to set the date and time of the processor. To do this click separately on the day, month and year of the processor so that it becomes highlighted. You may then type in a new

value or use the up and down arrows to change the values. This information is used in log files and crash reports.

Fixture Firmware
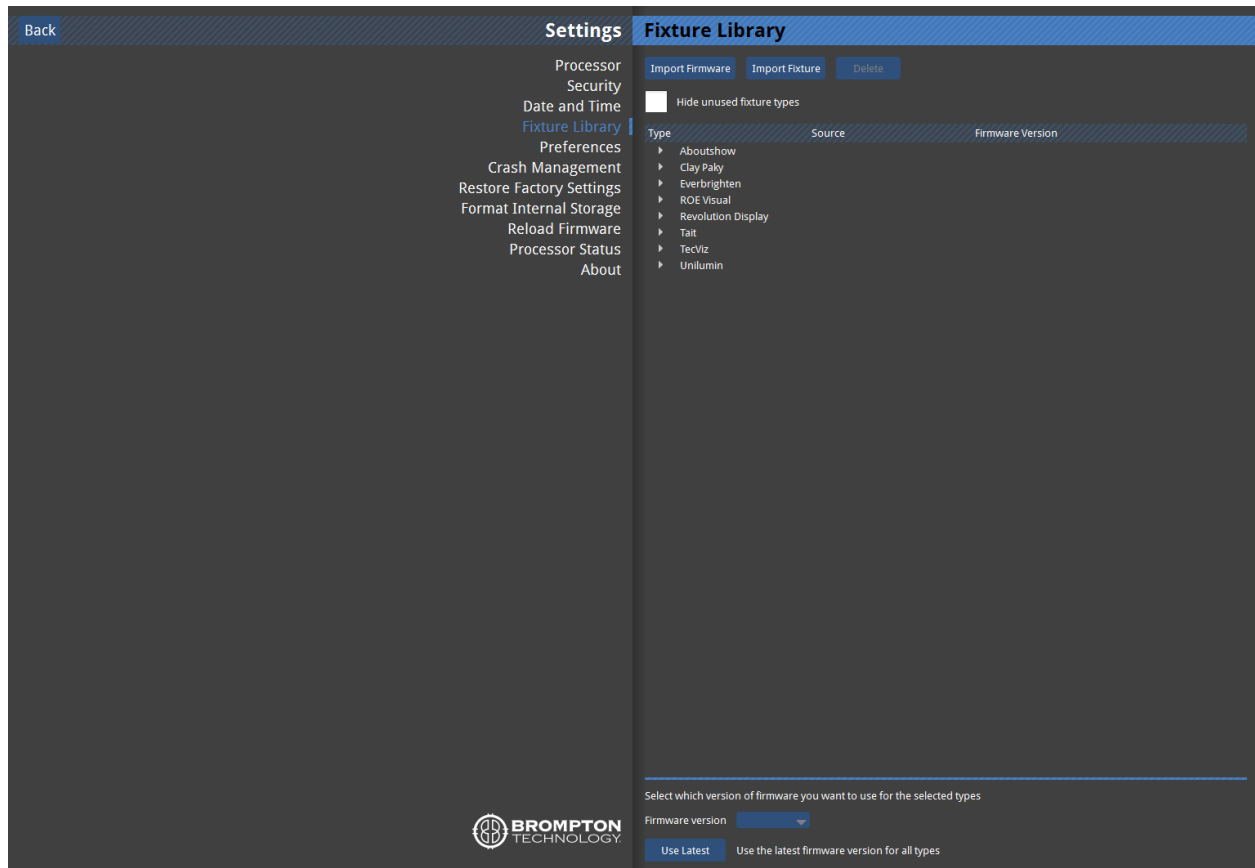
Figure 14-6. Fixture Firmware screen

This window allows you see which version of fixture firmware is currently set as the preferred for each type of supported fixture. Typically this will be the firmware version included with that version of processor software.

Should you wish to set the processor to upload a different version of fixture firmware which was not included with the release software of the processor it is possible to load newer (and older) versions of fixture firmware and assign these as the default for a particular fixture.

To do this:

1. Click on the **Import...** button at the top of the screen. You can now load new firmware from a USB flash drive or from the hard drive of a connected PC if using Tessera Remote.

2. Once the firmware is loaded assign that file to be the default by selecting the type from the list and selecting the firmware version from the dropdown menu at the bottom of the screen.

> **Note -** This window does not load firmware to any fixtures. It simply sets the preferred file to be used if you do decide to reload firmware from this processor. For more information on fixture firmware and the options for reloading see Reload Fixture Firmware
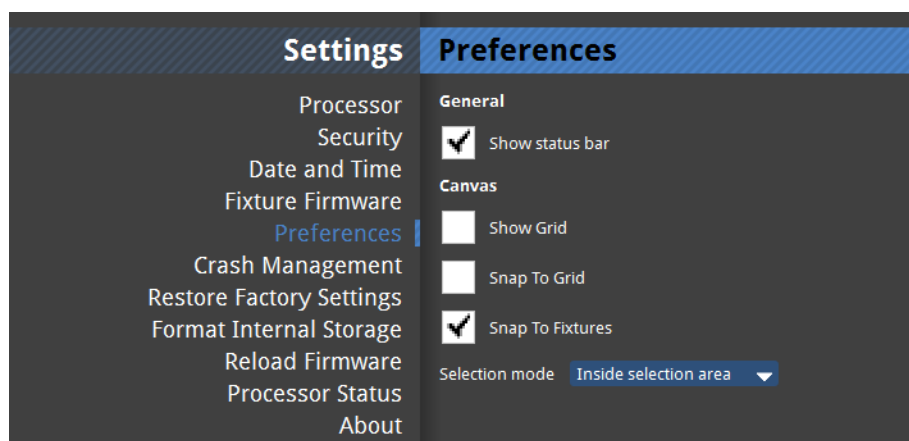
Preferences

Figure 14-7. Preferences

Auto Load

When the processor is turned on you are taken to the Start Screen, which displays Recent Projects on the right. The last used project file will appear at the top of this list and, if within 10 seconds no other file is selected or no other option is chosen, the processor will automatically load this file. If you do not want the processor to do this it is possible to disable this option so that the processor remains on the Start Screen until an option is selected.

> **Note -** It is possible to change the autoload countdown time to a value between 0-3600 seconds. It may be desirable to set this value to zero before the processor is used on a show, as this will mean that in the event of a power cut the processor will reboot straight into the current project file with the minimum of delay.

Status Bar
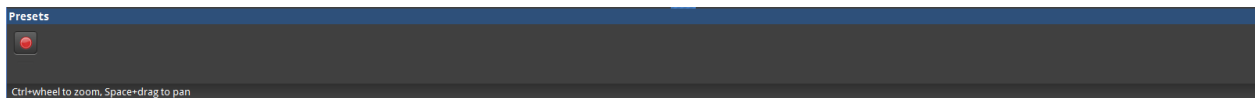
Figure 14-8. The Status Bar

The status bar is the line of text information in the bottom left corner of the Main Project Screen. This appears when the cursor is hovered over certain icons or when particular operations are undertaken. It provides keyboard shortcut information and tips to aid the user. If you wish to turn this off you can uncheck this option.

Canvas

This section contains settings to help with selecting and aligning fixtures on the canvas. These features are explained in "Using the Grid" on page 56 and "Fixture Layout" on page 51.

Crash Management

It is possible to set the processor to report crashes. If this option is enabled the processor will pause after a crash before rebooting to allow time for the user to enter information about what actions were performed before the crash. The time duration of this pause can be set between 0 and 3600 seconds. The saved crash reports can then be exported to a USB flash drive or similar. The crash reporter is to set to on by default.
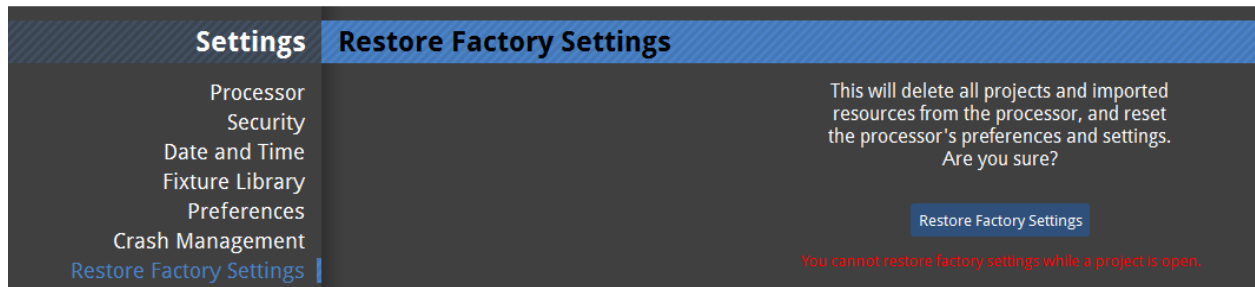
Restore factory settings

Figure 14-9. Restore factory settings

Restoring the factory settings will set all user definable characteristics of the processor back to defaults. This will wipe all project files from the memory of the processor and also any imported fixture definition files and fixture firmware not included in the current software release.
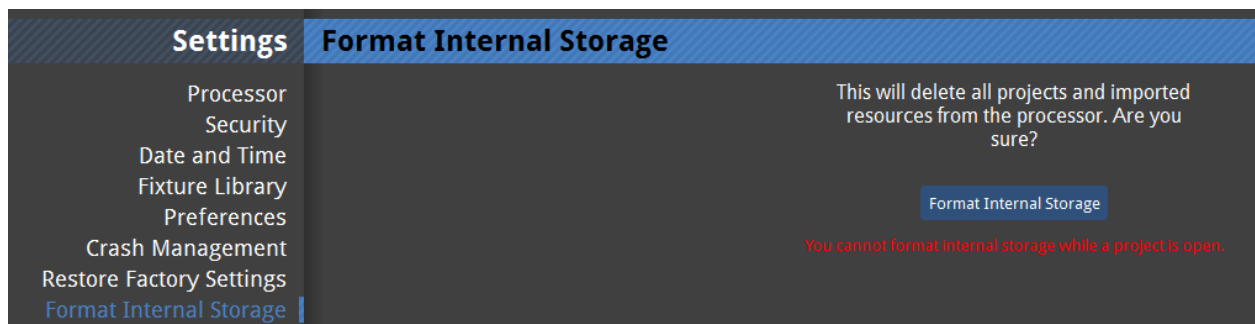
Format internal storage

Figure 14-10. Format internal storage

Format internal storage will overwrite the memory of the processor. This will wipe all project files from the memory of the processor and also any imported fixture definition files and fixture firmware not included in the current software release. The current software version of the processor will be retained after an internal storage format has been performed.

Reload firmware
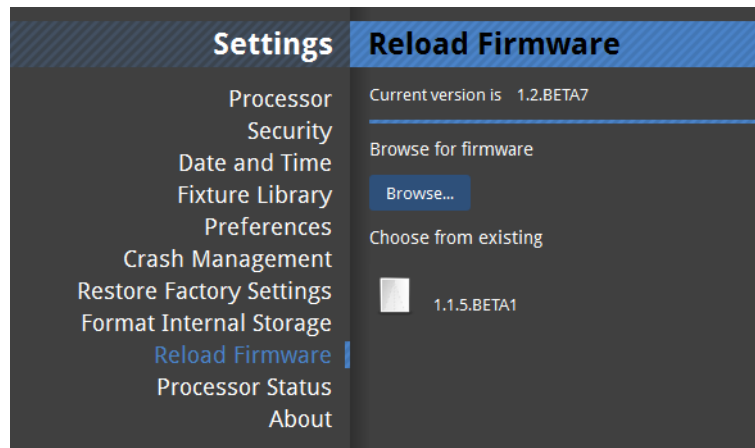
Figure 14-11. Reload Firmware

The reload firmware option allows the user to change the software which runs the processor. Any firmware builds which are uploaded to the processor are stored in internal flash memory and so you may see some older or newer builds under the heading **Choose from existing**.

If you do not see the build you wish to use in this menu you can load it from a USB flash drive or from the hard drive of a remote computer running Tessera Remote. To do this click on **Browse** and navigate to the location where the firmware is stored. You can download the latest processor software from our web site: www.bromptontech.com/support.

Once you have uploaded or chosen the build you wish to use you can reload the firmware. This is a very quick process after which your project files and additional fixture definition files should still be available to you. However it is wise to have backup copies of important project files before a firmware upgrade as a precaution.

> **Note -** Newer firmware versions will almost always allow you to load project files started on older versions of firmware. Projects started on newer versions of firmware will not normally work on older versions of firmware.

Processor Status

Settings	Processor Status
Processor	Refresh Export
Security	
Date and Time	
Fixture Library	**Firmware**	**DVI IO Card**
Preferences	Firmware Version 1.2.BETA7	Present Yes
Crash Management	Bootloader Version 0.19	Revision 2
Restore Factory Settings	PIC Version 0.14	Serial 045529-0012
Format Internal Storage	Front Panel Version 0.6	FPGA Version 0.6.8
Reload Firmware	Main FPGA Version 0.10.13	
Processor Status	DSP FPGA Version 0.7.37	**SDI IO Card**
About	**Hardware**	Present Yes

Firmware
Firmware Version 1.2.BETA7
Bootloader Version 0.19
PIC Version 0.14
Front Panel Version 0.6
Main FPGA Version 0.10.13
DSP FPGA Version 0.7.37

Hardware
Product Type M2
Serial Number BETA13
Management MAC Address 00:13:b2:22:01:30
DSP MAC Address 2 00:13:b2:22:01:31
Main FPGA MAC Address 00:13:b2:21:00:18
DIP Switches Off, Off, On, Off
Boot Source Flash 2
Boot Reason DSP Reset
Uptime 00h 23m 45s
SD Card Capacity 1.9 GB
Crypto Status Programmed

Network
IP Address 192.168.0.52
Subnet Mask 255.255.255.0
Default Gateway 0.0.0.0

Temperature
Front 35.5°C
Rear 36°C
FPGA 44.25°C
DSP 55.5°C

Fans
Fan 1 Status Ok
Fan 1 Speed 2593rpm
Fan 2 Status Ok
Fan 2 Speed 2581rpm

DVI IO Card
Present Yes
Revision 2
Serial 045529-0012
FPGA Version 0.6.8

SDI IO Card
Present Yes
Revision 3
Serial 046440-EX12-013

DMX IO Card
Present No
Revision
Serial

Ethernet IO Card
Present Yes
Revision 2
Serial 046441-EX12-027
MAC Address 1 00:13:b2:24:00:48
MAC Address 2 00:13:b2:24:00:49
MAC Address 3 00:13:b2:24:00:4a
MAC Address 4 00:13:b2:24:00:4b

Ethernet Expansion IO Card
Present Yes
Revision 1
Serial PTT3
MAC Address 1 00:13:b2:25:00:04
MAC Address 2 00:13:b2:25:00:05

Dropped Packets
Port 1 0/0/0/0
Port 2 0/0/0/0
Port 3 0/0/0/0
Port 4 0/0/0/0
Port 5 0/0/0/0
Port 6 0/0/0/0

Figure 14-12. Processor status window

The processor status window gives a significant amount of useful information on the current setup and the condition of the processor. This ranges from details of the current software and hardware setup to data about the temperature, network settings and revision numbers of particular components in the processor.

It is possible to export this data to an external USB flash drive or similar by clicking on the export button at the top of the page. You will then be able to choose the location to save the file which will have the name "xxxx_state.xml", where xxxx is the processor serial number. This can be very useful if you need to contact support and is one of the things which may be requested.

About

The About window contains info regarding the end user license agreement between Brompton and the user. Also included are third party license agreements relevant to the software, the company address and the support email address: support@bromptontech.com

Appendix 1 - Keyboard Shortcuts

Global

`Ctrl+Z`	Undo
`Ctrl+Shift+Z` or `Ctrl+Y`	Redo
`Delete` or `Back-space`	Delete selected fixtures or groups
`Escape`	End current task
`Ctrl+I`	Show properties for selected fixtures or groups (or for canvas if there is no selection)
While moving a slider, hold `Alt`	Don't snap to default value
`F1`	Go to Edit mode
`F2`	Go to Rear Edit mode
`F3`	Go to Video Only preview (Tessera processor only)
`F4`	Go to Video And Fixtures preview (Tessera processor only)
`F5`	Go to Video On Fixtures Only preview (Tessera processor only)
`F11`	Fullscreen (Tessera Remote and Offline Editor only)

Canvas

`Ctrl+left-click` on a fixture	Toggles its selection
`Double left-click` on a fixture	Select whole string
`Shift+left-click` on a group	Select fixture in group
`Ctrl+drag`	Create duplicates of the selected fixtures or groups
`Tab`	Select next fixture on string
`Shift+Tab`	Select previous fixture on string
`Up/Down/Left/Right Arrow`	Nudge selected fixtures or groups by grid spacing
`Shift+Up/Down/Left/Right Arrow`	Nudge selected fixtures or groups by one pixel
While adding fixtures, `Shift+left-click`	Add a new fixture and join it to the last added fixture
While adding fixtures, `Left-click and drag`	Create an array of fixtures
While adding fixtures, `Alt+wheel`	Set angle of new fixture
While moving fixtures or an array, hold `Alt`	Invert snapping behaviour
While resizing active area corner, hold `Ctrl`	Unlock aspect ratio
While resizing active area, hold `Alt`	Invert snapping behaviour
`Ctrl++`	Zoom In
`Ctrl+-`	Zoom Out
`Ctrl+0`	Zoom 1:1
`Ctrl+wheel`	Zoom in and out
`Middle-click and drag`	Zoom to the dragged rectangle
`Space+drag`	Pan the view

Appendix 2 - Supported Resolutions

Name	Horizontal Active	Vertical Active	Scan Type	Supported Frame Rates	Supported Input/s
NTSC (480i)	720	480	Interlaced	59.94Hz	SDI
NTSC (16:9)	720	480	Interlaced	59.94Hz	SDI
720x480p	720	480	Progressive	59.94Hz	DVI
720x480p (16:9)	720	480	Progressive	59.94Hz	DVI
PAL (576i)	720	576	Interlaced	50Hz	SDI
PAL (16:9)	720	576	Interlaced	50Hz	SDI
720x576p	720	576	Progressive	50Hz	DVI
720x576p (16:9)	720	576	Progressive	50Hz	DVI
640x480	640	480	Progressive	59.94, 60Hz	DVI
800x600	800	600	Progressive	50, 59.94, 60Hz	DVI
1024x768	1024	768	Progressive	50, 59.94, 60Hz	DVI
1280x768	1280	768	Progressive	50, 59.94Hz	DVI
1280x800	1280	800	Progressive	50, 59.94, 60Hz	DVI
1280x960	1280	960	Progressive	50, 59.94, 60Hz	DVI
1280x1024	1280	1024	Progressive	50, 59.94, 60Hz	DVI
1360x768	1360	768	Progressive	60Hz	DVI
1364x768	1364	768	Progressive	50, 59.94Hz	DVI
1364x1024	1364	1024	Progressive	50, 59.94Hz	DVI
1366x768	1366	768	Progressive	50, 59.94Hz	DVI
1366x800	1366	800	Progressive	50, 59.94, 60Hz	DVI
1440x900	1440	900	Progressive	59.94Hz	DVI
1440x1050	1440	1050	Progressive	50, 59.94, 60Hz	DVI
1536x768	1536	768	Progressive	50, 59.94Hz	DVI
1600x1050	1600	1050	Progressive	60Hz	DVI
1280x720p	1280	720	Progressive	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz	SDI
1280x720p	1280	720	Progressive	50, 59.94, 60Hz	DVI
1920x1080p	1920	1080	Progressive	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz	DVI and SDI
1920x1080i	1920	1080	Interlaced	50, 59.94, 60Hz	SDI

| 1920x1080PsF | 1920 | 1080 | Progressive Segmented Frame | 23.98, 24, 25, 29.97, 30Hz | SDI |

Appendix 3 - Setting IP Addresses

Setting the IP address on Windows

1. Click on the start menu and select Control Panel > Network and Internet > Network Connections. Select the network adapter you are connecting to the Tessera processor with.
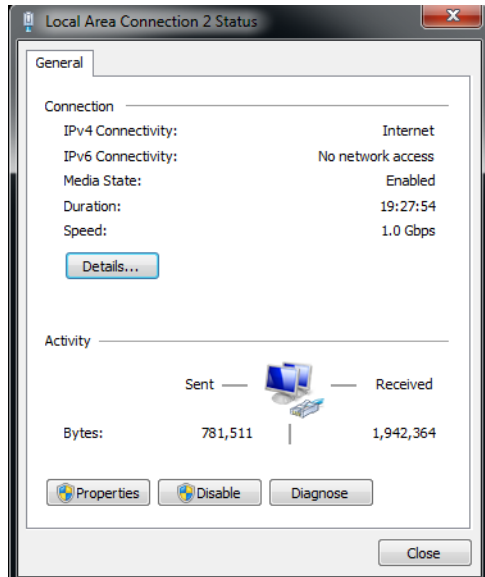

2. Select **Properties**. This will open the network adapter properties.
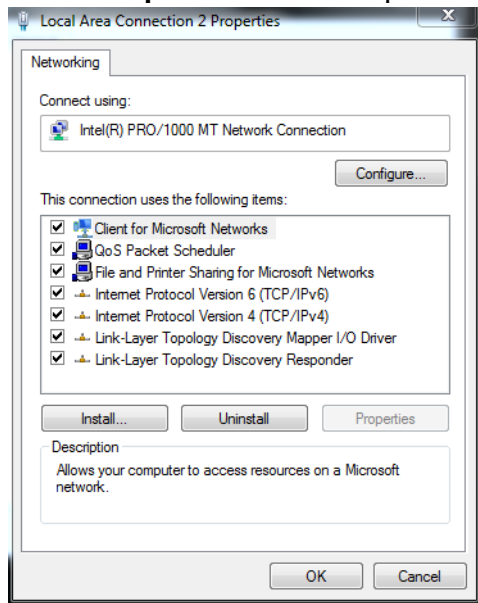
3. Double click on Internet Protocol Version 4 (TCP/IPv4). This will allow you do set an IP address.

4. Click on **Use the following IP address** to manually enter an IP address. Given that the default IP address of a Tessera processor is 192.168.0.50/ 255.255.255.0, choose an IP address that isn't already taken with in the 192.168.0.x range, where x is a number between 1 and 254, except for 50.
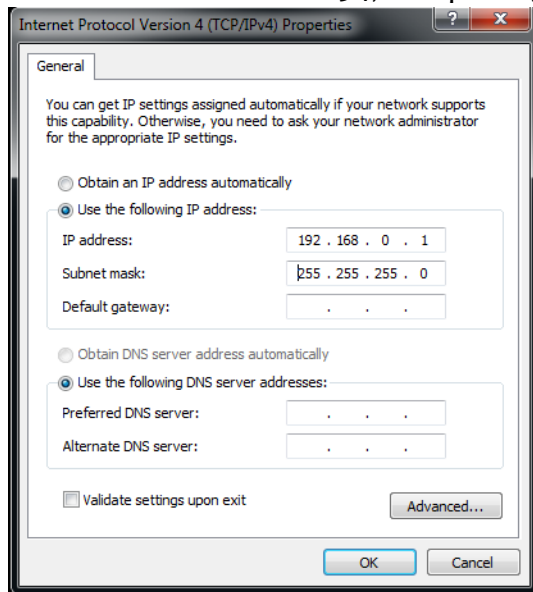
5. Click OK. Your computer should now be ready to connect to a Tessera processor.

Setting the IP address in Mac OS X

More recent Mac laptops have been shipped from Apple without a wired Ethernet network interface. To connect to a Tessera processor without using a WLAN requires either a USB – Gigabit Ethernet adapter or a Thunderbolt – Ethernet Adapter, both of which are available from third-party suppliers.

1. Click the Apple symbol in the top left corner of the main screen. Select System Preferences, and click on the Network icon.

2. Open the **Configure IPv4** dropdown menu and select **Manual** from the list of options.

3. In the IP Address box enter 192.168.0. and a value between 1 and 254 except 50, and a subnet mask of 255.255.255.0. Then click Apply and your Mac should be ready to connect to a Tessera Processor.
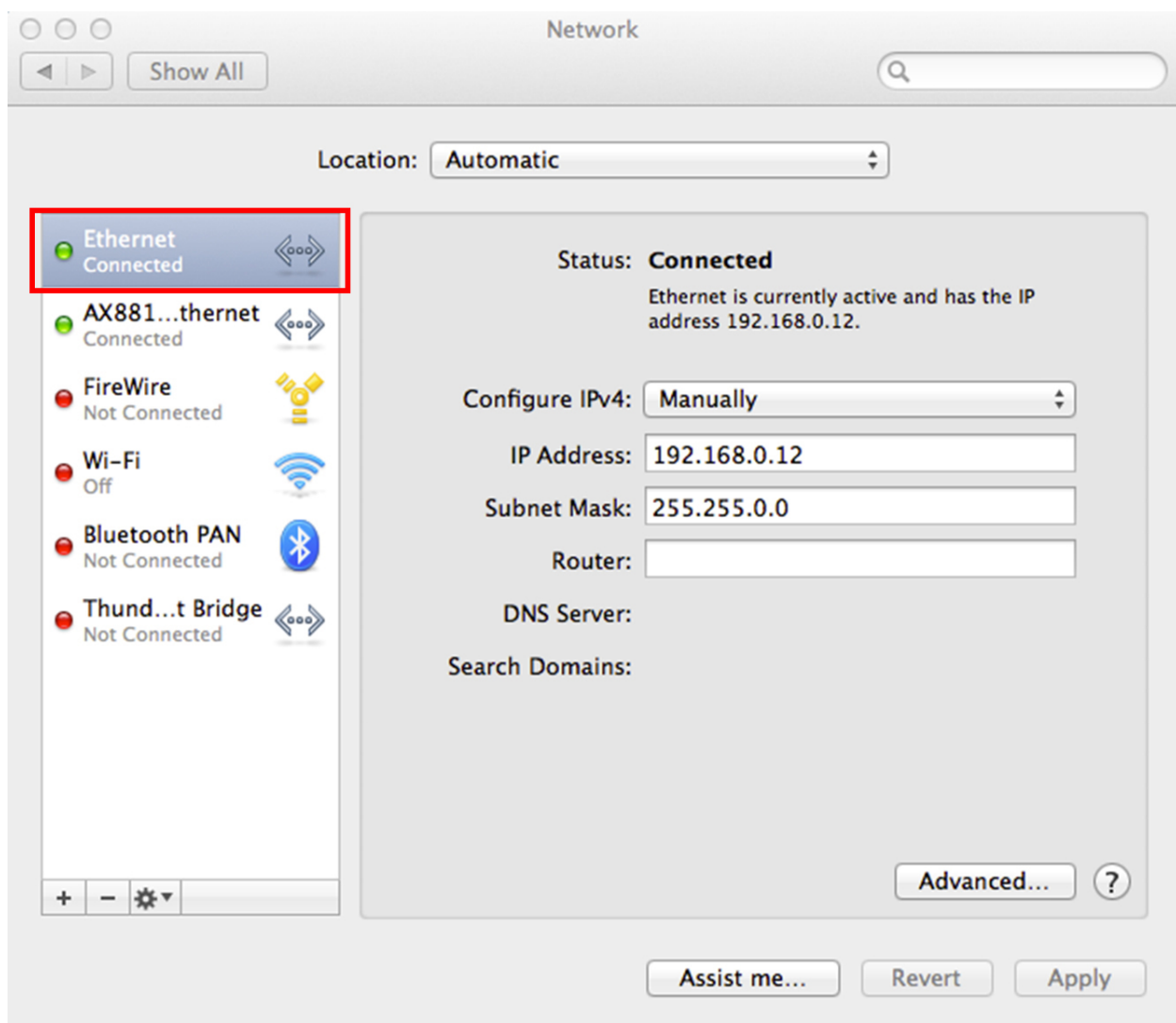
Appendix 4 - Warranty

Brompton Technology Limited ("Brompton") warrants that its Products will be free from defects in materials and workmanship for a period of two (2) years ("Warranty Period") from the original date of purchase and that any spare parts will be free from defects in materials and workmanship until the end of the Warranty Period or 3 months from the date of which they have been incorporated into the Product, whichever is the later.

In the event that warranty service is required, please contact Brompton's support email address (support@bromptontech.com).

Warranty Conditions

1. Brompton's obligations are limited to the repair of the defective part or, at its discretion, replacement of the Product or the defective part with a new Product or part.

2. The warranty is only valid where Brompton has received payment in full for the Product and the serial number has not been defaced.

3. It is the customer's obligation to notify Brompton within one week of any suspected defect and to return the Product prepaid to Brompton's nominated service address. Product will only be received under warranty when they are returned with a recognised RMA number that has been issued by Brompton.

4. Warranty repairs must be carried out by a nominated Brompton employee or Brompton approved agent or service technician. No reimbursement will be made for repairs carried out by non-Brompton personnel or dealers, and any such repair work or damage to the product caused by such repair work will not be covered by this warranty.

5. Product is not considered to be defective in materials or workmanship by reason that it requires adaptation in order to conform to national or local technical or safety standards in force in any country other than the one for which the Product was originally designed or manufactured. This warranty will not cover, and no reimbursement will be made for, such adaptation or any damage which may result.

6. This warranty covers none of the following:

    1. Maintenance and repair or replacement of parts due to normal wear and tear.

    2. Cost relating to transport, removal or installation of the Product.

    3. Misuse, including the failure to use the Product for its normal purposes or incorrect installation.

4. Damage caused by lightning, water, fire, acts of God, war, public disturbances, incorrect mains voltage, improper ventilation or any other cause beyond the control of Brompton.

7. This warranty is valid for any person who legally acquired possession of the Product during the warranty period.

8. The customer's statutory rights in any applicable national legislation arising from the purchase are not affected by this warranty. The rights under this warranty are the customer's sole rights and Brompton shall not be liable for any indirect or consequential loss, damages for any loss of use, time, profits or income, or any damage to related equipment, materials or consumable parts.

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