
# LKEY211

## Digital linear keyer

# USER MANUAL

Crystal Vision

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# Contents

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|---|---|---|
| Revision 8. | Rear module RM42 information added.<br>Indigo 4 connection details added<br>Manual format reorganised | 04-01-08 |
| Revision 9. | Rear module RM18 information amended. | 17-04-08 |

# 1 Introduction

The LKEY211 is a 10 bit broadcast quality Serial Digital linear keyer. It accepts either 625 or 525 SDI inputs and configures itself automatically for the incoming video standard.

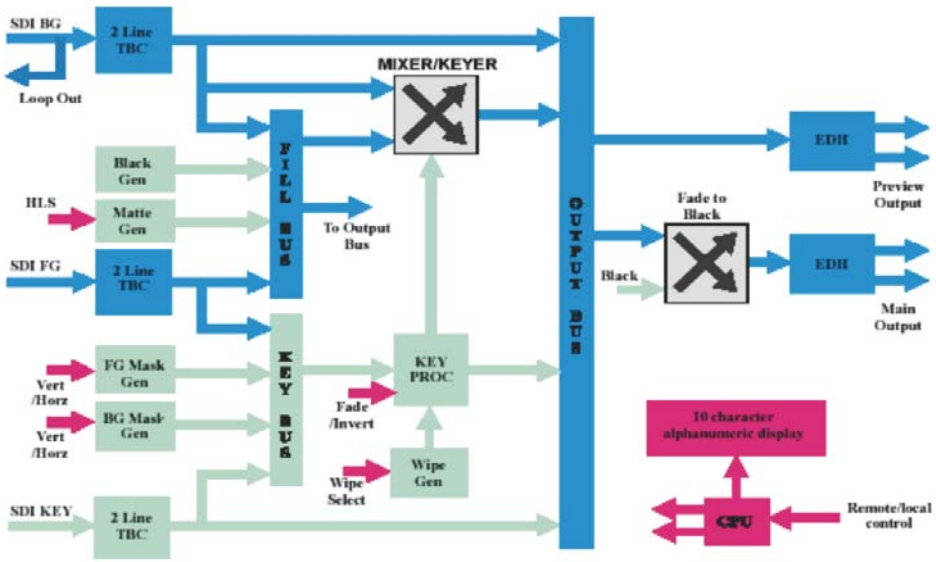
Both additive and multiplicative keying is provided to support sources with and without a dedicated alpha or key output. The unit may also be placed in mix or wipe mode and a range of simple wipe patterns are available.

To aid setup, the unit also benefits from a separate preview output that can be independently switched to internal and external sources such Foreground, Background, External Key and the final processed key.

Control options include board edge, GPI, Active Remote panel or a Safire Controller panel. An optional rear module with relay bypass can be used to maintain signal integrity during board removal and power outage.

The main features are as follows:

- Additive and multiplicative keying
- Self-key from Foreground
- Mix
- Wipe with 10 simple wipe patterns
- Fade to black
- Manual and automatic transitions
- Dual mask generation
- 625/525 operation
- Key offset, gain and inversion
- Main and preview outputs with EDH insertion
- Passes ancillary data and embedded audio
- GPI, Active Remote Panel, Safire Controller panel and board edge control




*The LKEY211 10 bit Digital Linear Keyer*

The LKEY211 is a single height module and will fit into all Crystal Vision rack frames. The 4U Indigo 4 frame will accommodate up to 24 single height LKEY211 modules, up to 12 modules in the 2U Indigo 2, six in the Indigo 1 and two in the Indigo DT desktop box. For other frames please refer to the appropriate frame manual.

## Control

The LKEY211 can be controlled from external GPIs, the board edge, active control panels and most conveniently from the Safire Controller panel with its T-Bar, assignable shaft encoders and clear matrix display.

### Board edge controls


### The Safire Controller - one panel controls up to 15 LKEY211 linear keyers or Safire Chroma keyers


### The Active control panel - one panel controls up to 24 keyers


GPI Control - intended to allow a custom panel, complete with T-bar if required, to control auto or manual transitions of key fade, fade to black, mix and wipe.

# 1.1 Key concepts

This chapter explains some of the concepts and terminology used in Self-keying, External Keying, mixing and wiping.

## Using the keyer

The LKEY211 Digital Linear Keyer can be used to add captions, graphics or logos to a SDI video source. Both External and Self-key modes are supported.

In the External Key mode it uses the luminance of a key signal to cut a hole in the Background into which ‘fill’ video, usually the Foreground signal, is inserted. In Self-key mode the luminance of the Foreground is used to generate the key.

In fact, the fill video may be selected from three video sources, a single colour from a matte generator, the Foreground video or the Background video. The key signal may be amplified, offset, inverted, combined with variable masks and faded in and out either manually or as a timed transition.

The variable mask output can be used as the key for sources that don't provide their own key or alpha channel output and where Self-keying is not appropriate.

The main output and preview outputs can independently show the video sources, the key, the final or composite video output or a preview of the Matte generator output.

## Additive and Multiplicative keying

This section will provide a more rigorous definition of keying in order to distinguish between Additive and Multiplicative keying modes.

Keying works by superimposing fill (usually Foreground) video over the top of the Background video. To prevent 'double images' where the fill and Background are added, the Background video is usually prepared by being 'faded to black' or 'cut out' wherever the fill video is to appear.

The signal that controls the 'hole cutting' or 'fade to black' is known as the key signal and the device that performs the operation is a multiplier. The rise and fall time of the key signal must be bandwidth controlled in the same way as normal video.

Such high quality keys are sometimes described as possessing 'shaped edges' and should never be larger than any Foreground graphic elements.

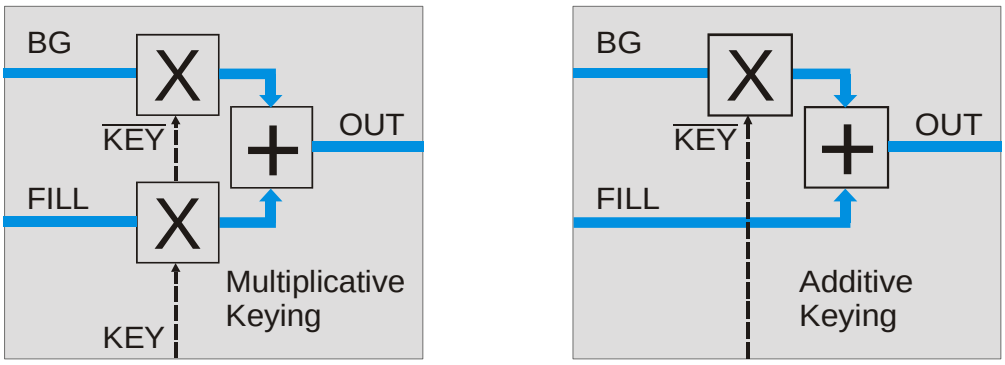
Where a Foreground signal consists of graphic elements with properly shaped edges against a black Background, it may be selected as fill and simply added to the prepared Background.

This is known as 'Additive keying' and is typically used with devices such as logo or character generators that provide a high quality key output which is also used to key their graphic output against a black Background.

Additive keying is usually preferred in this case since it often ensures the best image quality at the boundary between Foreground graphic edges and Background video.

If the fill video has graphics elements without 'shaped edges' or if it is full frame video and only the key signal defines the wanted Foreground subject(s) the fill must also be multiplied by the key signal prior to being added to the Background. This process is commonly (but inaccurately) referred to as multiplicative keying.

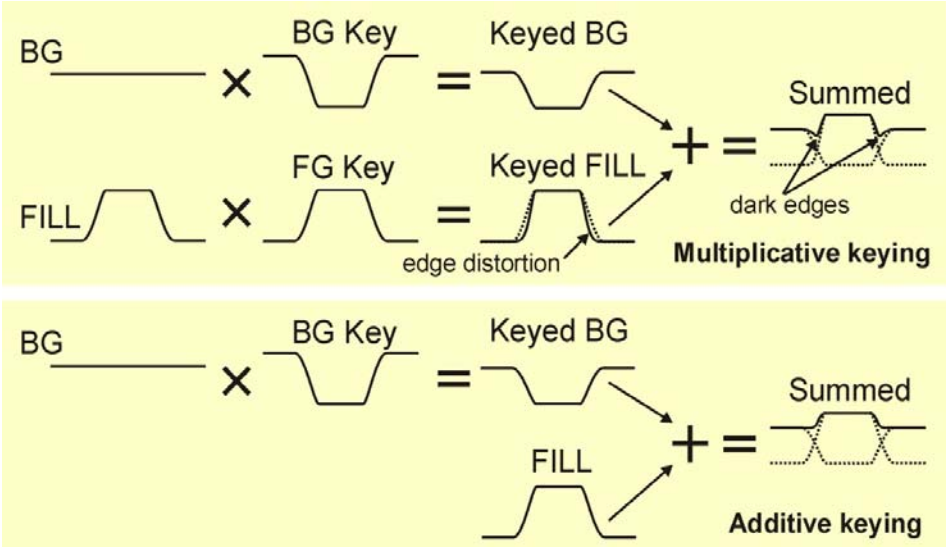
Multiplicative keying may be preferred as the default mode for most general keying operations, though experimentation with each mode together with key clip and gain settings often provides the best final result.




*Multiplicative versus additive keying*

**Note:** The key is inverted when used to prepare the Background video before the fill video is added but is not inverted when defining wanted areas of the fill in 'Multiplicative' keying.

Additive keying avoids 'double shaping' graphic or text image outlines, which might otherwise appear to have a black outline when the key signal provided has already been used to prepare the edges of graphic elements of the selected fill video.




*Additive keying may avoid edge distortion due to an unnecessary multiplier stage*

**Tip:** A typical application for Additive keying is for character generators that supply a high quality key and also use this key to prepare their own video text output against a black Background.

## Using a Self-key

A Self-key uses the luminance or black and white information of the Foreground video to create the key source. This key which may be combined with Foreground and Background masks, cuts a hole in the Background into which Foreground video is placed.

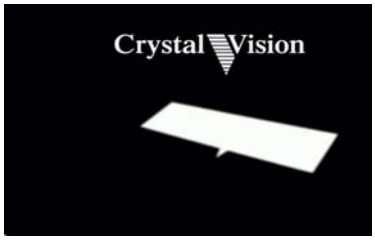

*Foreground input to be used as Self-key*


*Composite output – Foreground input used as Fill*

**Note:** Self-keys and External Keys cannot be used at the same time.

## Using an External Key

The External Key may be used where external graphics are available with a separate key signal. An example would be a character generator output where only the key signal itself has accurate and correctly formed edges. In this case the External Key signal is normally preferred to a Self-key, to avoid the edge distortion discussed in Section 2.2.




*External Key*


*Foreground graphics*


*Composite showing Foreground over Background*

**Note:** A positive key such as the one shown above will require the key to be inverted in the External Key menu.
An External Key and a Self-key cannot be used at the same time.

## Using masks

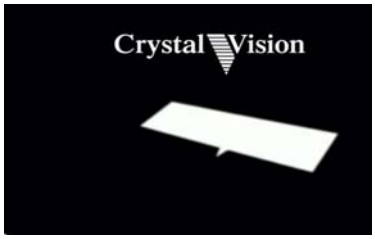
Sometimes a key source may contain imperfections or incorrect detail, which may key undesirable fill detail. These unwanted areas of the fill video can usually easily be removed by 'forcing' the Background with a Foreground mask. Similarly wanted areas of the Foreground can be forced with a Background mask. A special downstream Background mask ensures that the Foreground can always be forced over the final keyer output.

The effect of adjusting the mask can be seen by viewing any signal on the Output Bus that is downstream of the keyer and the Final Key itself.

The following mask facilities are provided:

Background, Foreground and External Key masks may be used together or independently

Masks may be turned on or off and inverted and adjusted in position and size




*External Key*


*Foreground graphics*


*Mask + Ext key = Total key*


*Adjust Background mask to force Background subject*


*Foreground over Background except in area of force Background mask*

**Tip:** Mis-adjusting key clip and gain may make mask visible on composite output.

**Note:** A Safire Chroma keyer can be used in the above example to place the subject on top of the blue graphic logo on the grass using a special composite External Key in addition to a Chroma key. Please refer to the Safire User manual for further details.

## Mixing and wiping

In these modes the unit will perform a mix or wipe between the Foreground and Background video sources. The mix or wipe can be controlled manually with the T-Bar, or by setting an auto-transition triggered from the EFFECT button on the control panel, or from remote control.

The internal wipe pattern generator has eight wipe patterns available as shown in the following table:

| | | | |
|---|---|---|---|
|  | Vertical |  | Left Corner |
|  | Horizontal |  | Right Corner |
|  | Vertical Blind |  | Box |
|  | Horizontal Blind |  | Cross |

*LKEY211 Wipe Patterns*

# 2 Hardware installation

## 2.1 Rear modules and signal I/O

LKEY211 is a single height module that will fit into all Crystal Vision rack frames. The 4U frames will accommodate 24 cards, the 2U frame will accommodate up to 12 modules, and six modules will fit in the 1U frame and 2 into the Desktop box.

## 2.2 Rear modules and signal I/O

### Indigo 4, 2, 1 and DT frame rear connectors

Up to 24 single height modules may be fitted in an Indigo 4 frame depending on the choice of rear connector. The three types of rear connector available provide system flexibility by allowing a mix between access to all connections and maximum module packing density. All modules can be plugged in and removed while the frame is powered without damage.

Relay bypass automatically switches between the Background input and main output in the event of a frame power failure or the removal of the LKEY211 and is available when using the single height RM42. The signal path will remain in bypass mode for approximately 15 seconds to maintain signal integrity until the LKEY211 has finished configuring.

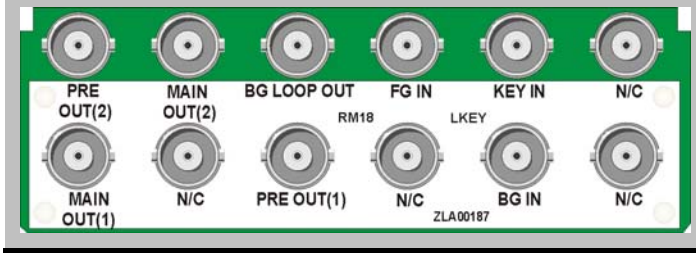
The available rear connectors are as follows:

### RM01

| RM01 rear connectors | Description |
|---|---|
|  | **RM01**<br>• 24 modules per Indigo 4<br>• 12 modules per Indigo 2<br>• Six modules per Indigo 1<br>• Two modules per Indigo DT<br>• All frame slots can be used |

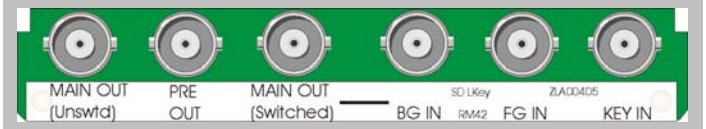
| BNC | Description |
|---|---|
| MAIN OUT(2) | Serial Digital Main output 2 |
| PRE OUT | Serial Digital Preview output |
| BG IN | Serial Digital Background input |
| FG IN | Serial Digital Foreground input |
| KEY IN | Serial Digital External Key input |
| MAIN OUT(1) | Serial Digital Main output 1 |

## RM18

| RM18 rear connector | Description |
|---|---|
|  | **RM18 (ZLA00175 artwork)**<br>• 12 modules per Indigo 4<br>• Six modules per Indigo 2<br>• Three modules per Indigo 1<br>• One modules per Indigo DT<br>• Alternate slots used. Card fits in upper slot.<br>• No card fits in lower slot. |

| BNC | Description |
|---|---|
| N/C | No connection |
| KEY IN | Serial Digital External Key input |
| FG IN | Serial Digital Foreground input |
| BG LOOP OUT | Serial Digital Background loop though output |
| MAIN OUT(2) | Serial Digital Main output 2 |
| PRE OUT(2) | Serial Digital Preview output 2 |
| N/C | No connection |
| BG IN | Serial Digital Background input |
| N/C | No connection |
| PRE OUT(1) | Serial Digital Preview output 1 |
| N/C | No connection |
| MAIN OUT(1) | Serial Digital Main output 1 |

## RM42 with relay bypass

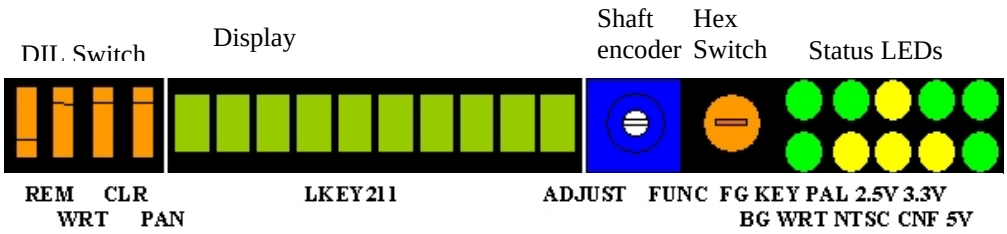
| RM42 rear connectors | Description |
|---|---|
|  | **RM42**<br>• 24 modules per Indigo 4<br>• 12 modules per Indigo 2<br>• Six modules per Indigo 1<br>• Two modules per Indigo DT<br>• All frame slots can be used |

| BNC | Description |
|---|---|
| MAIN OUT(Unswtd) | Serial Digital Main output unswitched |
| PRE OUT | Serial Digital Preview output |
| MAIN OUT(Switched) | Serial Digital Main output switched |
| BG IN | Serial Digital Background input |
| FG IN | Serial Digital Foreground input |
| KEY IN | Serial Digital External Key input |

# 2.3 Module configuration

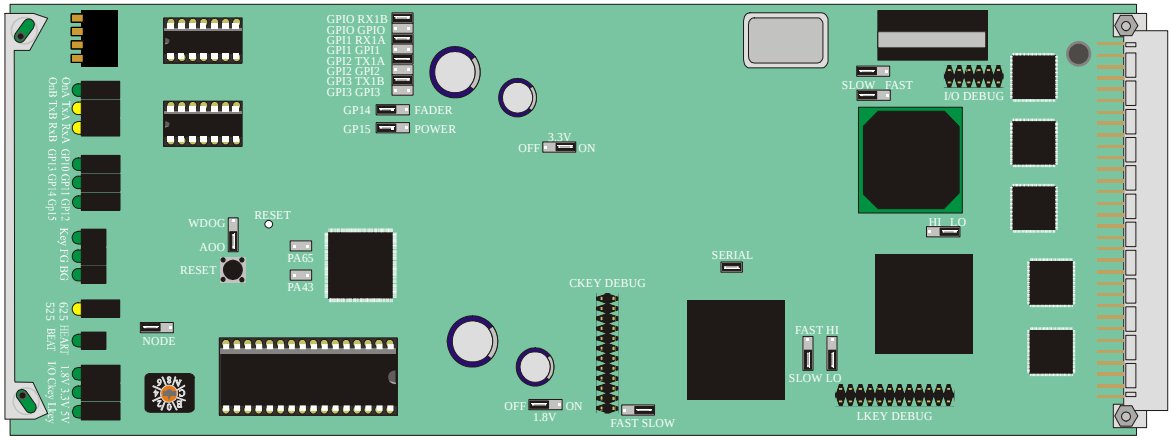
There are three external control methods for the LKEY211 - serial (including the Crystal Vision Active Control Panel), the Safire Controller panel and by GPI inputs.

Each control method requires configuration of the front card edge DIL switch and unique card jumper settings are required if either GPI or panel control is required.




The LKEY211 front view

| Control | DIL 1 | DIL 4 |
|---|---|---|
| **Board Edge** | UP | UP |
| **GPI** | UP | DOWN |
| **Active Panel** | DOWN | UP |
| **Safire Controller Panel & latching GPI control** | DOWN | DOWN |




LKEY211 jumper locations

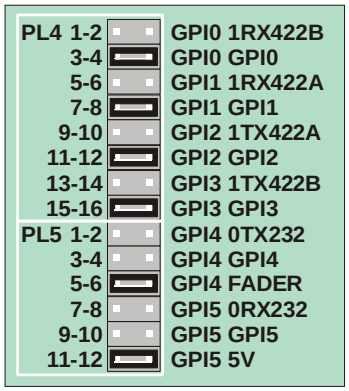
GPI control is intended for use with a custom panel, complete with T-bar if required. Suitable short to ground switches and a T-bar needs to be connected to the remote connector on the rear of the frame. This permits auto or manual transitions of key fade, fade to black, mix and wipe from the custom panel.

**Note:** GPI mode will disable panel control.

## Control assignment

The change from GPI to panel control is accomplished by changing the card edge DIL switch setting and by moving the position of four jumpers at header block PL4 on the LKEY211 module. GPI mode may additionally required changing jumpers at header block PL5.

PL4/5 set for GPI control




The following table lists the jumper functions:

| PL4/5 Jumper | Silkscreen | Function | Rem ref | Type |
|---|---|---|---|---|
| **PL4 pins 3-4** | GPI0 GPI0 | Fade key up or down | 'a' | Default GPI state is +5V. Momentary pull down to ground selects the function. |
| **PL4 pins 7-8** | GPI1 GPI1 | Mix from/to FG to/from BG | 'b' | |
| **PL4 pins 11-12** | GPI2 GPI2 | Wipe from/to FG to/from BG | 'c' | |
| **PL4 pins 15-16** | GPI3 GPI3 | Fade to/from black | 'd' | |
| **PL5 pins 3-4** | GPI4 GPI4 | Latch to 0V to fade key down | 'e' | Latching GPI* |
| **PL5 pins 5-6** | GPI4 FADER | Connects to wiper (middle) terminal of T-bar | 'e' | Analogue |
| **PL5 pins 9-10** | GPI5 GPI5 | Latch to 0V to fade to black | 'f' | Latching GPI* |
| **PL5 pins 11-12** | GPI5 5V | Connects to top terminal of T-bar | 'f' | 5V DC supply |

* For the latching GPI control DIL switches 1 and 4 should be down.

If panel control is required jumpers at header block PL4 **MUST** be set as follows:

| PL4 jumper | Silkscreen | PL4 Jumper | Silkscreen |
|---|---|---|---|
| **PL4 pins 1-2** | GPI0 IRX422B | **PL4 pins 9-10** | GPI2 ITX422A |
| **PL4 pins 5-6** | GPI1 IRX422A | **PL4 pins 13-14** | GPI3 ITX422B |

**Note:** Analogue T-bar resistance for GPI control is 10KOhms.
PL4 GPIs all have pull-up resistors fitted.
PL5 pins OTX232 and ORX232 are reserved for factory use only.
Jumpers J1, J2, J3 and J4 should be left in the RS422 position.

# 2.4 General Purpose Interface (GPI)

Each slot has an associated set of connections on the frame rear-panel remote connectors. For convenience, GPI lines are associated with reference codes ‘a’ to ‘f’ in the connector pin-out tables for each frame.

## 4U frame GPI connections

GPI lines ‘a’ to ‘f’ of each card connect to two of eight rear remote connectors as follows:

| Slot no. | | ‘a’ pin | ‘b’ pin | ‘c’ pin | ‘d’ pin | ‘e’ pin | ‘f’ pin |
|---|---|---|---|---|---|---|---|
| **1** | Upper | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |
| **3** | | 8 (3) | 9 (3) | 18 (3) | 26 (3) | 19 (4) | 20 (4) |
| **4** | | 7 (3) | 16 (3) | 17 (3) | 25 (3) | 10 (4) | 11 (4) |
| **5** | | 5 (1) | 6 (1) | 15 (1) | 24 (1) | 1 (2) | 2 (2) |
| **6** | | 4 (1) | 14 (1) | 13 (1) | 23 (1) | 3 (2) | 4 (2) |
| **7** | | 5 (3) | 6 (3) | 15 (3) | 24 (3) | 1 (4) | 2 (4) |
| **8** | | 4 (3) | 14 (3) | 13 (3) | 23 (3) | 3 (4) | 4 (4) |
| **9** | | 3 (1) | 12 (1) | 22 (1) | 21 (1) | 12 (2) | 13 (2) |
| **10** | | 10 (1) | 11 (1) | 19 (1) | 20 (1) | 21 (2) | 22 (2) |
| **11** | | 3 (3) | 12 (3) | 22 (3) | 21 (3) | 12 (4) | 13 (4) |
| **12** | | 10 (3) | 11 (3) | 19 (3) | 20 (3) | 21 (4) | 22 (4) |
| **Slot no.** | | **‘a’ pin** | **‘b’ pin** | **‘c’ pin** | **‘d’ pin** | **‘e’ pin** | **‘f’ pin** |
| **1** | Lower | 8 (5) | 9 (5) | 18 (5) | 26 (5) | 19 (6) | 20 (6) |
| **2** | | 7 (5) | 16 (5) | 17 (5) | 25 (5) | 10 (6) | 11 (6) |
| **3** | | 8 (7) | 9 (7) | 18 (7) | 26 (7) | 19 (8) | 20 (8) |
| **4** | | 7 (7) | 16 (7) | 17 (7) | 25 (7) | 10 (8) | 11 (8) |
| **5** | | 5 (5) | 6 (5) | 15 (5) | 24 (5) | 1 (6) | 2 (6) |
| **6** | | 4 (5) | 14 (5) | 13 (5) | 23 (5) | 3 (6) | 4 (6) |
| **7** | | 5 (7) | 6 (7) | 15 (7) | 24 (7) | 1 (8) | 2 (8) |
| **8** | | 4 (7) | 14 (7) | 13 (7) | 23 (7) | 3 (8) | 4 (8) |
| **9** | | 3 (5) | 12 (5) | 22 (5) | 21 (5) | 12 (6) | 13 (6) |
| **10** | | 10 (5) | 11 (5) | 19 (5) | 20 (5) | 21 (6) | 22 (6) |
| **11** | | 3 (7) | 12 (7) | 22 (7) | 21 (7) | 12 (8) | 13 (8) |
| **12** | | 10 (7) | 11 (7) | 19 (7) | 20 (7) | 21 (8) | 22 (8) |

*Table shows pin number (remote number)*

**Note:** Remote 1, Remote 3, Remote 5 and Remote 7 are 26-way high-density D-Type female sockets. Frame ground is pin 2 and +5V @500mA is pin 1 in each case.

Remote 2, Remote 4, Remote 6 and Remote 8 are 26-way high-density D-Type male plugs and frame ground is pin 6 in each case and +5V @500mA is pin 15 on Remote 2 and Remote 6.

**Note:** The +5V output is protected by self-resetting thermal fuses, which limit the total output current available from Remotes 1-4 to approximately 1A. Remotes 5-8 are similarly protected.

## Indigo 2 GPI Connections

GPI lines 'a' to 'f' of each card are brought to one of the four remote connectors at the rear of the FR2AV frame as follows:

| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|---|---|---|---|---|---|---|
| **1** | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |
| **3** | 8 (3) | 9 (3) | 18 (3) | 26 (3) | 19 (4) | 20 (4) |
| **4** | 7 (3) | 16 (3) | 17 (3) | 25 (3) | 10 (4) | 11 (4) |
| **5** | 5 (1) | 6 (1) | 15 (1) | 24 (1) | 1 (2) | 2 (2) |
| **6** | 4 (1) | 14 (1) | 13 (1) | 23 (1) | 3 (2) | 4 (2) |
| **7** | 5 (3) | 6 (3) | 15 (3) | 24 (3) | 1 (4) | 2 (4) |
| **8** | 4 (3) | 14 (3) | 13 (3) | 23 (3) | 3 (4) | 4 (4) |
| **9** | 3 (1) | 12 (1) | 22 (1) | 21 (1) | 12 (2) | 13 (2) |
| **10** | 10 (1) | 11 (1) | 19 (1) | 20 (1) | 21 (2) | 22 (2) |
| **11** | 3 (3) | 12 (3) | 22 (3) | 21 (3) | 12 (4) | 13 (4) |
| **12** | 10 (3) | 11 (3) | 19 (3) | 20 (3) | 21 (4) | 22 (4) |

**Note:** Remote 1 and Remote 3 are 26 way high density 'D' type female sockets and frame ground is pin 2 in each case. Remote 2 and Remote 4 are 26 way high density 'D' type male plugs and frame ground is pin 6 in each case.
Table shows Pin number (Remote number).

## Indigo 1

| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|---|---|---|---|---|---|---|
| **1** | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |
| **3** | 5 (1) | 6 (1) | 15 (1) | 24 (1) | 1 (2) | 2 (2) |
| **4** | 4 (1) | 14 (1) | 13 (1) | 23 (1) | 3 (2) | 4 (2) |
| **5** | 3 (1) | 12 (1) | 22 (1) | 21 (1) | 12 (2) | 13 (2) |
| **6** | 10 (1) | 11 (1) | 19 (1) | 20 (1) | 21 (2) | 22 (2) |

**Note:** Remote 1: 26 way high-density D-type socket. Frame ground is pin 2.
Remote 2: 26 way high-density D-type plug. Frame ground is pin 6.
Table shows Pin number (Remote number).

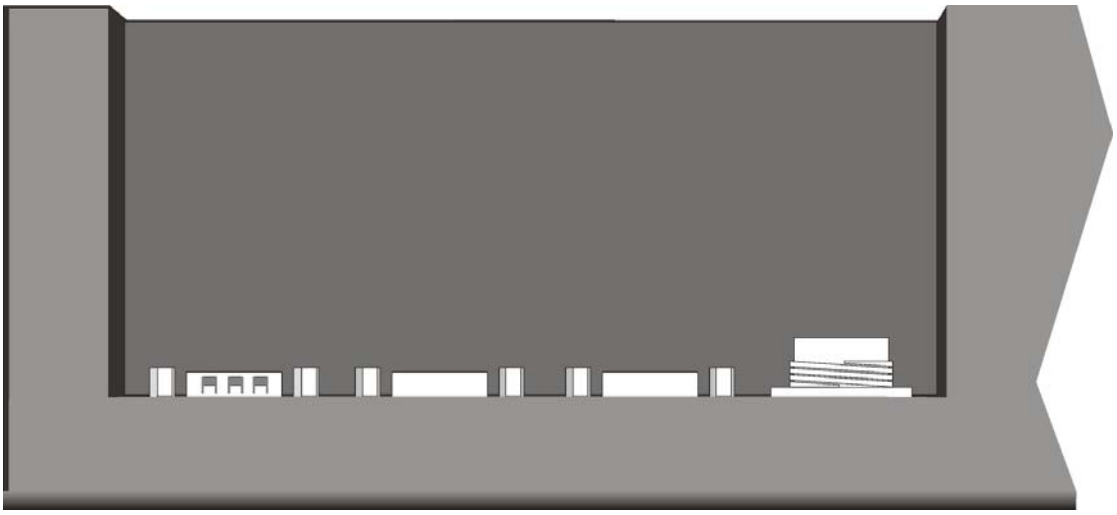
## Indigo DT

| Slot no. | 'a' pin | 'b' pin | 'c' pin | 'd' pin | 'e' pin | 'f' pin |
|---|---|---|---|---|---|---|
| **1** | 8 (1) | 9 (1) | 18 (1) | 26 (1) | 19 (2) | 20 (2) |
| **2** | 7 (1) | 16 (1) | 17 (1) | 25 (1) | 10 (2) | 11 (2) |

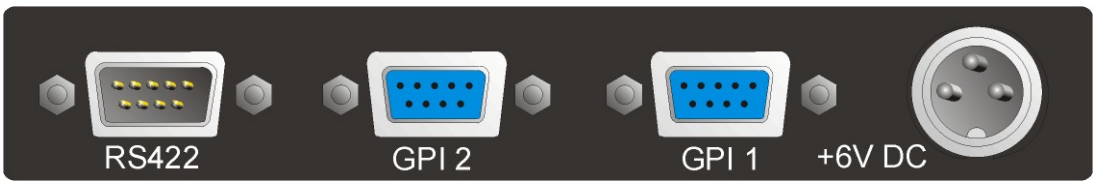
**Note:** Remote 1: 26 way high-density D-type socket. Frame ground is pin 2.
Remote 2: 26 way high-density D-type plug. Frame ground is pin 6.
Table shows Pin number (Remote number).

## 2.5 Control panel connectors

The control panel requires a cable from the “RS422” connector on the panel to one or more of the “Remote” connectors on the rear of the frame.



*Rear of Safire Controller panel showing connector side view*




*Safire Controller panel connectors*

A dedicated external power supply supplied with the control panel, screws into the three-pin power socket.

The RS422 connector is used to connect the control panel to frames containing Safire modules. If more than one LKEY211 is to be controlled, a daisy-chain configuration will be required.

The GPI 1 connector s used to allow remote assignment of the Safire panel to a particular LKEY211 module according to its node address in connected frames.

The GPI 2 connector provides access to unassigned Panel GPI outputs whose state is stored in LKEY211 module preset memory but output from an assigned Safire controller panel.

Safire Controller panel to frame wiring details is provided in the Frame-panel interconnect wiring section

Frame and Panel GPI I/O pin out is given in the GPI section.

# 2.6 Frame-panel interconnect wiring

To connect Safire Controller panels to frames select the wiring according to the frame.

## 4U frame remote 1, 3, 5 and 7

To connect a control panel to one or more LKEY211 modules in a 4U frame make the connections given for the relevant slot or slots.

The connector at the control panel end of the cable should be 9-way standard density D-type socket.

The connector(s) at the 2U-frame end of the cable should be 26-way high-density D-type plug(s).

| Slot No | Control panel 'RS422' D-type pin | | | | |
|---|---|---|---|---|---|
| | 1 Gnd | 2 Rx- | 3 Tx+ | 7 Rx+ | 8 Tx- |
| **1** | Rem 1, pin 2 | Rem 1, pin 26 | Rem 1, pin 9 | Rem 1, pin 18 | Rem 1, pin 8 |
| **2** | Rem 1, pin 2 | Rem 1, pin 25 | Rem 1, pin 16 | Rem 1, pin 17 | Rem 1, pin 7 |
| **3** | Rem 3, pin 2 | Rem 3, pin 26 | Rem 3, pin 9 | Rem 3, pin 18 | Rem 3, pin 8 |
| **4** | Rem 3, pin 2 | Rem 3, pin 25 | Rem 3, pin 16 | Rem 3, pin 17 | Rem 3, pin 7 |
| **5** | Rem 1, pin 2 | Rem 1, pin 24 | Rem 1, pin 6 | Rem 1, pin 15 | Rem 1, pin 5 |
| **6** | Rem 1, pin 2 | Rem 1, pin 23 | Rem 1, pin 14 | Rem 1, pin 13 | Rem 1, pin 4 |
| **7** | Rem 3, pin 2 | Rem 3, pin 24 | Rem 3, pin 6 | Rem 3, pin 15 | Rem 3, pin 5 |
| **8** | Rem 3, pin 2 | Rem 3, pin 23 | Rem 3, pin 14 | Rem 3, pin 13 | Rem 3, pin 4 |
| **9** | Rem 1, pin 2 | Rem 1, pin 21 | Rem 1, pin 12 | Rem 1, pin 22 | Rem 1, pin 3 |
| **10** | Rem 1, pin 2 | Rem 1, pin 20 | Rem 1, pin 11 | Rem 1, pin 19 | Rem 1, pin 10 |
| **11** | Rem 3, pin 2 | Rem 3, pin 21 | Rem 3, pin 12 | Rem 3, pin 22 | Rem 3, pin 3 |
| **12** | Rem 3, pin 2 | Rem 3, pin 20 | Rem 3, pin 11 | Rem 3, pin 19 | Rem 3, pin 10 |

| Slot No | 1 Gnd | 2 Rx- | 3 Tx+ | 7 Rx+ | 8 Tx- |
|---|---|---|---|---|---|
| **13** | Rem 5, pin 2 | Rem 5, pin 26 | Rem 5, pin 9 | Rem 5, pin 18 | Rem 5, pin 8 |
| **14** | Rem 5, pin 2 | Rem 5, pin 25 | Rem 5, pin 16 | Rem 5, pin 17 | Rem 5, pin 7 |
| **15** | Rem 7, pin 2 | Rem 7, pin 26 | Rem 7, pin 9 | Rem 7, pin 18 | Rem 7, pin 8 |
| **16** | Rem 7, pin 2 | Rem 7, pin 25 | Rem 7, pin 16 | Rem 7, pin 17 | Rem 7, pin 7 |
| **17** | Rem 5, pin 2 | Rem 5, pin 24 | Rem 5, pin 6 | Rem 5, pin 15 | Rem 5, pin 5 |
| **18** | Rem 5, pin 2 | Rem 5, pin 23 | Rem 5, pin 14 | Rem 5, pin 13 | Rem 5, pin 4 |
| **19** | Rem 7, pin 2 | Rem 7, pin 24 | Rem 7, pin 6 | Rem 7, pin 15 | Rem 7, pin 5 |
| **20** | Rem 7, pin 2 | Rem 7, pin 23 | Rem 7, pin 14 | Rem 7, pin 13 | Rem 7, pin 4 |
| **21** | Rem 5, pin 2 | Rem 5, pin 21 | Rem 5, pin 12 | Rem 5, pin 22 | Rem 5, pin 3 |
| **22** | Rem 5, pin 2 | Rem 5, pin 20 | Rem 5, pin 11 | Rem 5, pin 19 | Rem 5, pin 10 |
| **23** | Rem 7, pin 2 | Rem 7, pin 21 | Rem 7, pin 12 | Rem 7, pin 22 | Rem 7, pin 3 |
| **24** | Rem 7, pin 2 | Rem 7, pin 20 | Rem 7, pin 11 | Rem 7, pin 19 | Rem 7, pin 10 |

## 2U frame remote 1 and 3

To connect a control panel to one or more LKEY211 modules in a 2U frame make the connections given for the relevant slot or slots.

The connector at the control panel end of the cable should be 9-way standard density D-type socket.

The connector(s) at the 2U-frame end of the cable should be 26-way high-density D-type plug(s).

| Slot No | Control panel 'RS422' D-type pin | | | | |
|---|---|---|---|---|---|
| | 1 Gnd | 2 Rx- | 3 Tx+ | 7 Rx+ | 8 Tx- |
| **1** | Rem 1, pin 2 | Rem 1, pin 26 | Rem 1, pin 9 | Rem 1, pin 18 | Rem 1, pin 8 |
| **2** | Rem 1, pin 2 | Rem 1, pin 25 | Rem 1, pin 16 | Rem 1, pin 17 | Rem 1, pin 7 |
| **3** | Rem 3, pin 2 | Rem 3, pin 26 | Rem 3, pin 9 | Rem 3, pin 18 | Rem 3, pin 8 |
| **4** | Rem 3, pin 2 | Rem 3, pin 25 | Rem 3, pin 16 | Rem 3, pin 17 | Rem 3, pin 7 |
| **5** | Rem 1, pin 2 | Rem 1, pin 24 | Rem 1, pin 6 | Rem 1, pin 15 | Rem 1, pin 5 |
| **6** | Rem 1, pin 2 | Rem 1, pin 23 | Rem 1, pin 14 | Rem 1, pin 13 | Rem 1, pin 4 |
| **7** | Rem 3, pin 2 | Rem 3, pin 24 | Rem 3, pin 6 | Rem 3, pin 15 | Rem 3, pin 5 |
| **8** | Rem 3, pin 2 | Rem 3, pin 23 | Rem 3, pin 14 | Rem 3, pin 13 | Rem 3, pin 4 |
| **9** | Rem 1, pin 2 | Rem 1, pin 21 | Rem 1, pin 12 | Rem 1, pin 22 | Rem 1, pin 3 |
| **10** | Rem 1, pin 2 | Rem 1, pin 20 | Rem 1, pin 11 | Rem 1, pin 19 | Rem 1, pin 10 |
| **11** | Rem 3, pin 2 | Rem 3, pin 21 | Rem 3, pin 12 | Rem 3, pin 22 | Rem 3, pin 3 |
| **12** | Rem 3, pin 2 | Rem 3, pin 20 | Rem 3, pin 11 | Rem 3, pin 19 | Rem 3, pin 10 |

## 1U and DT frame Remote 1

To connect a control panel to one or more LKEY211s in a 1U frame make the connections to the D-type "Remote 1" as given for the relevant slot or slots.

The connector at the control panel end of the cable should be 9-way standard density D-type socket.

The connector at the 1U frame end of the cable should be a 26 way high density D-type plug.

| Slot No | Control panel "RS422" D-type pin | | | | |
|---|---|---|---|---|---|
| | 1 Gnd | 2 Rx- | 3 Tx+ | 7 Rx+ | 8 Tx- |
| **1** | pin 2 | pin 26 | pin 9 | pin 18 | pin 8 |
| **2** | pin 2 | pin 25 | pin 16 | pin 17 | pin 7 |
| **3** | pin 2 | pin 24 | pin 6 | pin 15 | pin 5 |
| **4** | pin 2 | pin 23 | pin 14 | pin 13 | pin 4 |
| **5** | pin 2 | pin 21 | pin 12 | pin 22 | pin 3 |
| **6** | pin 2 | pin 20 | pin 11 | pin 19 | pin 10 |

**Note:** The Indigo DT only utilises slots 1 and 2.

### Example

For example, to control a LKEY211 module in slot 1 the cable would need to be…

| Control panel "RS422" D-type | | Indigo 1 remote 1 |
|---|---|---|
| **pin 1 Gnd** | connects to | pin 2 |
| **pin 2 Rx-** | connects to | pin 26 |
| **pin 3 Tx+** | connects to | pin 9 |
| **pin 7 Rx+** | connects to | pin 18 |
| **pin 8 Tx-** | connects to | pin 8 |

…And to control LEKY211 modules in slots 2 and 5 the cable would need to be

| Control panel "RS422" D-type | | Indigo 1 remote 1 | | Indigo 1 remote 1 |
|---|---|---|---|---|
| **pin 1 Gnd** | connects to | pin 2 | and to | pin 2 |
| **pin 2 Rx-** | connects to | pin 25 | and to | pin 21 |
| **pin 3 Tx+** | connects to | pin 16 | and to | pin 12 |
| **pin 7 Rx+** | connects to | pin 17 | and to | pin 22 |
| **pin 8 Tx-** | connects to | pin 7 | and to | pin 3 |

## Remote control port settings

The standard remote control port settings are as follows:

| Parameter | Setting |
|---|---|
| **Baud rate** | 19k2 |
| **Parity** | None |
| **Data bits** | 8 |
| **Stop bits** | 1 |
| **Handshaking** | None |

Please contact factory for remote protocol.

# 2.7 Software upgrades

The software for the LKEY211 module is contained in a single EPROM U35. To change this remove the board from the frame and lever out the EPROM using an IC extraction tool or small flat bladed screwdriver. Replace the EPROM making sure that the notch on the IC faces away from the rear connector.

## 2.8 Jumper setting summary

The following table summarises the board jumper settings.

| Jumper | Function |
|---|---|
| **J1** | Selects Channel 0 serial communications for Active Front Panel or remote diagnostics<br>**Default:** Link to 1RX422 to select RS-422 and Active Front Panel.<br>Link to 1RX232 to select RS-232 and remote diagnostics. |
| **J2** | Selects Channel 0 serial communications for Active Front Panel or remote diagnostics.<br>**Default:** Link to 0TX422 to select RS-422 and Active Front Panel.<br>Link to 0TX232 to select RS-232 and remote diagnostics. |
| **J3** | Selects Channel 1 serial communications Safire Controller Panel or remote diagnostics.<br>**Default:** Link to 1RX422 to select RS-422 and Safire Controller Panel.<br>Link to 1RX232 to select RS-232 and remote diagnostics. |
| **J4** | Selects Channel 1 serial communications Safire Controller Panel or remote diagnostics.<br>**Default:** Link to 1TX422 to select RS-422 and Safire Controller Panel.<br>Link to 1TX232 to select RS-232 and remote diagnostics. |
| **J5** | **Default:** Link to 3V3 ON |
| **J6** | **Default:** Link to WDOG |
| **J7** | **Default:** Link to >27512 |
| **J8** | **Default:** Link to 2V5 ON |
| **J9** | Selects a further 16 node addresses.<br>**Default:** With J9 open allows node switch SW3 to select nodes 0 to 15.<br>J9 shorted allows node switch SW3 to select nodes 16 to 31. |
| **PL4** | Link pins 1-2 for serial remote control by Safire Controller Panel. |
| | Link pins 5-6 for serial remote control by Safire Controller Panel. |
| | Link pins 9-10 for serial remote control by Safire Controller Panel. |
| | Link pins 13-14 for serial remote control by Safire Controller Panel. |
| | Link pins 3-4 for remote control by GPI. |
| | Link pins 7-8 for remote control by GPI. |
| | Link pins 11-12 for remote control by GPI. |
| | Link pins 15-16 for remote control by GPI. |
| **PL5** | Link pins 1-2 for Diagnostic Communications on Remote Connector. |
| | Link pins 3-4 for GPI contact closure control of GPI4 |
| | Link pins 5-6 for GPI T-bar fader control. |
| | Link pins 7-8 for Diagnostic Communications on Remote Connector. |
| | Link pins 9-10 for GPI contact closure control of GPI5 |
| | Link pins 11-12 for GPI T-bar fader control. |

**WARNING!** On no account should factory set jumpers be moved from their default positions, unless guided to do so in this manual or by Crystal Vision support personnel.

# 3 Card edge operation

Although the LKEY211 is best operated through a dedicated interface such as the Safire Controller Panel, all functions can be accessed using board edge controls.

## 3.1 Card edge controls

The front edge of the card provides LED status and power rail monitoring, menu selection, rotary set-up controls and a ten-digit visual status display.


The LKEY211 front view

The four position DIL switch to the left of the matrix display selects the control options whilst the FUNC switch selects operational modes and the rotary ADJUST control is used to select the required value or parameter.

A change made using the Adjust control is generally implemented immediately and there is no need for a separate ‘save’ or ‘enter’ function.

### Setting control options

Select the control method with the DIL switch as follows:

| Control | DIL 1 | DIL 4 |
|---|---|---|
| **Board Edge** | UP | UP |
| **GPI** | UP | DOWN |
| **Active Panel** | DOWN | UP |
| **Safire Controller Panel** | DOWN | DOWN |

GPI control is intended for use with a custom panel, complete with T-bar if required. Suitable short to ground switches and a T-bar needs to be connected to the remote connector on the rear of the frame. This permits auto or manual transitions of key fade, fade to black, mix and wipe.

**Note:** GPI and Safire Controller Panel control require additional jumper configuration - refer to the installation section 5.2 for further hardware control configuration options.
The card edge display shows the current menu accessed if any remote mode is selected.

## Selecting default user memories

Overwrite the ten non-volatile user memories with default values as follows:

| | DIL 3 | Notes |
|---|---|---|
| **Normal** | UP | No Effect |
| **Overwrite** | DOWN | Leave in this position during power up to overwrite user memories |

**Note:** DIL 2 has no function.

## Operational modes

There are five operational modes available for the LKEY211:

- Key mode
- Mask mode
- Mix mode
- Wipe mode
- Setup mode

## Selecting the operational mode

To select the required mode set the FUNC switch set to zero and rotate the ADJUST control until the required mode is displayed. Then use the FUNC switch to select the desired function. The ADJUST shaft encoder can then be rotated to select the required value or parameter.

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **0** | KEY MODE<br>MASK MODE<br>MIX MODE<br>WIPE MODE<br>SETUP MODE | KEY MODE | Selects the basic operational mode. |

**Note:** The LKEY211 cannot be operated in more than one mode at a time. For example, mixing and keying cannot be performed together.

## Key mode

Key mode provides access to the following parameters:

- Keying type (additive/multiplicative keying + key fade On/Off)
- Fill video source
- Key offset, gain and polarity
- Self-key On/Off
- Key fade value & duration
- Fade to black (FTB) On/Off, value & duration
- Key & FTB automation options

### Selecting keying type and key fade

Enter KEY mode and set the FUNC switch to number 1 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 1 | Multiply<br>Additive<br>Mult+Fade<br>Add+Fade | Mult+Fade | This parameter selects the keying type. Two types are available: multiplicative and additive. These two types can also have key fade ability. |

### Selecting the fill source

Enter KEY mode and set the FUNC switch to number 2 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 2 | Fill=Back<br>Fill=Fore<br>Fill=Black<br>Fill=Matte | Fill=Fore | Selects fill to key into Background. Where Black is digital black, Fore is Foreground video, Back is Background video and Matte is the current colour from the internal Matte generator. |

## Adjusting key offset, gain and polarity

Enter KEY mode and set the FUNC switch to the required number and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **3** | Lift = (-128 to 127) | 0 | Alters the amount of lift added to the key signal. Negative lift reduces the 'DC' or brightness level of the key whilst positive lift increases it. |
| **4** | Gain=(0 to 399%) | 100% | Alters the amount of key signal gain or contrast and ranges from zero to 4 times gain. |
| **7** | KeyInv Off<br>KeyInv On | Off | Inverts the final key signal including force masks. |

## Selecting a self key

Enter KEY mode and set the FUNC switch to number 8 and the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **8** | SelfKey Off<br>SelfKey On | Off | Turns self fill keying on or off. Self-keying uses Foreground luminance information to key the Foreground into the Background. If self-fill keying is turned off the External Key is used. |

## Adjusting key fade options

Enter KEY mode and set the FUNC switch to the required number and the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **5** | Fade=(0 to 1023) | 1023 | Controls the amount of fade applied to the key signal. A value of zero turns the key off and a value of 1023 turns the key fully on. |
| **A** | Fade T=(1 to 999) | 50 | Controls the number of fields to use in the key fade transition. A value of 1 performs an instant fade up or down. |

**Note:** Fade only works in Multi+Fade and Add+Fade modes.

## Adjusting fade to black parameters

Enter KEY mode and set the FUNC switch to the required number and the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **6** | FtoBk=(0 to 1023) | 1023 | Controls the amount of fade to black applied to the main output channel. A value of zero fades the output completely to black and a value of 1023 leaves the output unaffected. |
| **9** | FtoBk Off<br>FtoBk On | On | Turns the fade to black function on or off. Turning it off prevents accidental fade to black in live use. |
| **B** | F2Bk T=(1 to 999) | 50 | Controls the number of fields to use in the fade to black transition. A value of 1 performs an instant fade up or down. |

## Adjusting key and FTB automatic transition options

Enter KEY mode and set the FUNC switch to the required number and the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **C** | Fade Up<br>Fade Down | Up | Selects whether the key should start to fade up or down under automatic control. |
| **D** | Fade Stop<br>Fade Start | Stop | Starts the automatic transition and can re-trigger if selected again before the transition has finished. When a transition has finished the transition direction is automatically toggled to the opposite direction. |
| **E** | From Black<br>To Black | From Black | Selects whether the fade should start from black or to black under automatic control. |
| **F** | F2Bk Stop<br>F2Bk Start | Stop | Starts the automatic transition and can retrigger if selected again before the transition has finished. When a transition has finished the transition direction is automatically toggled to the opposite direction. |

# Masks mode

Masks mode provides access to the following parameters:

- Selecting Background or Foreground mask priority
- Background mask options
- Foreground mask options
- External Key options – mask polarity and External Key off

## Selecting mask priority

Enter MASKS mode and set the FUNC switch to number 1 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 1 | Back Prior<br>Fore Prior | Back Prior | Selects whether the Background force mask or the Foreground force mask has priority |

**Note:** The priority setting determines whether the Background or Foreground force mask takes precedence when they overlap. When mask priority is set to fore the Foreground mask remains unmodified by the Background mask (if the masks overlap, the Foreground mask will control the area of overlap). When the priority is set to back the Background mask remains unmodified by the Foreground mask.

## Selecting Background mask options

Enter MASKS mode and set the FUNC switch to the required number and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 2 | BGForce Off<br>BGForce On | Off | Turns the Background force mask on or off |
| 3 | BGFInv Off<br>BGFInv On | Off | Inverts the Background force mask |
| 4 | BGFHor= 0 to 723) | 100 | Horizontal position of Background force mask |
| 5 | BGFVer=(o to 288) | 100 | Vertical position of Background force mask |
| 6 | BGFWid=(0 to 723) | 100 | Width of Background force mask |
| 7 | BGFHgt=(0 to 288) | 100 | Height of Background force mask |

## Selecting Background mask options

Enter MASKS mode and set the FUNC switch to the required number and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 8 | FGForce Off<br>FGForce On | Off | Turns the Foreground force mask on or off |
| 9 | FGFInv Off<br>FGFInv On | Off | Inverts the Foreground force mask |
| A | FGFHor= 0 to 723) | 100 | Horizontal position of Foreground force mask |
| B | FGFVer=(0 to 288) | 100 | Vertical position of Foreground force mask |
| C | FGFWid=(0 to 723) | 100 | Width of Foreground force mask |
| D | FGFHgt=(0 to 288) | 100 | Height of Foreground force mask |

## Selecting External Key options

Enter MASKS mode and set the FUNC switch to the required number and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| E | Alpha On<br>Alpha Off | On | Turns the External Key on and off. |
| F | A Inv Off<br>A Inv On | Off | Inverts the External Key only |

**Note:** With the External Key turned off only the force masks are used for keying.

# Mix mode

Mix mode provides access to the following parameters:

- Selecting mix value
- Mix transition duration
- Mix transition automation options

## Selecting the mix value

Enter MIX mode and set the FUNC switch to number 1 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 1 | Mix=(0 to 1023) | 0 | Controls the amount of mixing between Foreground and Background |

## Selecting the mix transition duration

Enter MIX mode and set the FUNC switch to number 2 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 2 | Mix T=(1 to 999) | 50 | Controls the number of fields to use in the mix transition. A value of 1 performs an instant cut. |

## Adjusting mix automatic transition options

Enter MIX mode and set the FUNC switch to the required number and the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 3 | To Foregnd<br>To Backgnd | To Foregnd | Selects whether the mix should start towards the Foreground or the Background under automatic control. |
| 4 | Mix Stop<br>Mix Start | Mix Stop | Starts the automatic transition and can re-trigger if selected again before the transition has finished. When a transition has finished the transition direction is automatically toggled to the opposite direction. |

# Wipe mode

Wipe mode provides access to the following parameters:

- Select wipe pattern
- Wipe value
- Wipe transition duration
- Wipe transition automation options

## Selecting the wipe pattern

Enter WIPE mode and set the FUNC switch to number 1 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Wipe pattern |
|---|---|---|---|
| 1 | Horizontal | Cross | Horizontal |
| | Vertical | | Vertical |
| | HorizBlind | | Horizontal blind |
| | Vert Blind | | Vertical blind |
| | LeftCorner | | Left corner |
| | RghtCorner | | Right corner |
| | Box | | Box |
| | Cross | | Cross |

## Selecting the wipe value

Enter WIPE mode and set the FUNC switch to number 2 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 2 | Wipe=(0 to 1023) | 0 | Controls the amount of wiping between Foreground and Background |

## Selecting the wipe transition duration

Enter WIPE mode and set the FUNC switch to number 3 and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 3 | Wipe T=(1 to 999) | 50 | Controls the number of fields to use in the wipe transition. A value of 1 performs an instant cut. |

### Adjusting wipe automatic transition options

Enter WIPE mode and set the FUNC switch to the required number and the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 4 | To Foregnd<br>To Backgnd | To Foregnd | Selects whether the wipe should start towards the Foreground or the Background under automatic control. |
| 5 | Mix Stop<br>Mix Start | Stop | Starts the automatic transition and can re-trigger if selected again before the transition has finished. When a transition has finished the transition direction is automatically toggled to the opposite direction. |

## Setup mode

Setup mode provides access to the following parameters:

- Recall and store settings
- Main output select
- Preview output select
- Timing reference select
- Horizontal delay select
- Matte generator adjust
- EDH on/off

### Recalling and storing user settings

Enter SETUP mode and set the FUNC switch to the required number and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| 1 | Mem Loc=(1 to 10) | 1 | Selects the memory location to store or recall settings |
| 2 | Recall?<br>Recall OK | Recall? | Instantly recalls the settings previously stored in the selected location of the non-volatile memory. |
| 3 | Store?<br>Store OK | Store? | Writes the current setting to the chosen memory location. The yellow WRT LED comes on during the write process and goes off when finished. |

**Note:** During a Recall the operational mode i.e. KEY, MIX or WIPE is also recalled so the FUNC hex switch is relevant for that mode.
Default settings may be recalled by using the card edge DIL switch lever 3 as explained in section 4.2

## Selecting the Main output video bus

Enter SETUP mode and set the FUNC switch to number 4 and move the ADJUST shaft encoder to select which video bus to route to the main outputs:

| FUNC | Display Text | Default | Main output video bus select |
|---|---|---|---|
| 4 | Main=Off | Main= Comp | Off sends digital black to main outputs. |
| | Main=Comp | | Comp sends composite key with fill video to main outputs. |
| | Main=Fore | | Fore sends Foreground video to main outputs. |
| | Main=Back | | Back sends Background video to main outputs. |
| | Main=KeyIn | | KeyIn sends External Key input to main outputs (including chrominance information if present). |
| | Main=BGKey | | BGKey sends processed key signal to main outputs. |
| | Main=Matte | | Matte sends internally generated matte to the main outputs. |

## Selecting the Preview output video bus

Enter SETUP mode and set the FUNC switch to number 5 and move the ADJUST shaft encoder to select which video bus to route to the preview output:

| FUNC | Display Text | Default | Preview output video bus select |
|---|---|---|---|
| 5 | Prev=Auto | Prev= Auto | Selects video bus according to operational mode – see Preview auto mode below |
| | Prev=Comp | | Comp sends composite key with fill video to preview output. |
| | Prev=Fore | | Fore sends Foreground video to preview output. |
| | Prev=Back | | Back sends Background video to preview output. |
| | Prev=KeyIn | | KeyIn sends External Key input to preview output (including chrominance information if present). |
| | Prev=BGKey | | BGKey sends processed key signal to preview output. |
| | Prev=Matte | | Matte sends internally generated matte to preview output. |

## Preview auto mode

In Key Mode, Auto sends the fully keyed composite video signal to the preview outputs when the key fade is zero. When the key fade is non-zero the composite key with fill video is sent to the preview outputs. However, if Foreground force is set to ON then the preview output will show the composite key with fill.

In Mix and Wipe Modes, Auto sends the Foreground video signal to the preview outputs when the transition is towards the Foreground. When the transition is towards the Background the Background video is sent to the preview outputs.

## Selecting the timing reference

Enter SETUP mode and set the FUNC switch to number 6 and move the ADJUST shaft encoder to select the timing reference source:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **6** | Ref=Key<br>Ref=Fore<br>Ref=Back | Ref=Back | Selects the input channel used as the timing reference. |

## Adjusting the horizontal delay

Enter SETUP mode and set the FUNC switch to number 7 and move the ADJUST shaft encoder to select the horizontal delay:

| FUNC | Display Text | Default | Function |
|---|---|---|---|
| **7** | HDLy=(0.0 to 127.0) | HDLy=4.4 | Selects the horizontal delay in microseconds (µs) up to a maximum of 2 lines. |

**Note:** Knob 1 adjusts the output delay relative to the input chosen as a reference. The delay changes approximately over a 126µs range from about 2µs to 128µs. The useful range of adjustment depends on the relative timing of the inputs. The setting should be adjusted so that the output is less than 128µs after the earliest input and more than 2µs after the latest input.

## Adjusting the Matte generator

Enter SETUP mode and set the FUNC switch to the required number and move the ADJUST shaft encoder to select the required value or parameter:

| FUNC | Display Text | Default | Matte generator parameter |
|---|---|---|---|
| 8 | Hue=(0 to 359) | 0 | Hue value |
| 9 | Lum=(0 to 255) | 128 | Luminance value |
| A | Sat=(0 to 255) | 255 | Saturation value |

### Selecting EDH On/Off

Enter SETUP mode and set the FUNC switch to B and move the ADJUST shaft encoder to turn EDH generation on or off:

| FUNC | Display Text | Default | EDH generation On/Off |
|---|---|---|---|
| **B** | EDH if Off<br>EDH is On | EDH is Off | Turns EDH generation for the main and preview outputs on or off |

# 3.2 Card edge command cross-reference

| FUNC | KEY | MASKS | MIX | WIPE | SETUP |
|---|---|---|---|---|---|
| **0** | **selects control function** | | | | |
| **1** | Select keying type and fade | Select mask priority | Adjust mix value | Select wipe pattern | Select memory location |
| **2** | Select the fill source | Background force on/off | Adjust mix transition time | Adjust wipe value | Recall settings from selected location |
| **3** | Adjust key lift | Background force invert on/off | Select mix direction | Adjust wipe transition time | Save settings to selected location |
| **4** | Adjust key gain | Background force horizontal pos. | Start / stop mix transition | Select wipe direction | Select source for main output |
| **5** | Adjust key fade amount | Background force vertical pos. | | Start / stop wipe transition | Select source for preview output |
| **6** | Adjust fade to black amount | Background force width. | | | Select timing reference |
| **7** | Key invert on/off | Background force height. | | | Adjust delay |
| **8** | Self key on/off | Foreground force on/off | | | Adjust matte hue |
| **9** | Fade to Black on/off | Foreground force invert on/off | | | Adjust matte luminance |
| **A** | Adjust key fade time | Foreground force horizontal pos. | | | Adjust matte saturation |
| **B** | Adjust fade to black time | Foreground force vertical pos. | | | EDH on output on/off |
| **C** | Select key fade direction | Foreground force width. | | | |
| **D** | Start / stop key fade | Foreground force height. | | | |
| **E** | Select fade to black direction | External Key on/off | | | |
| **F** | Start / stop fade to black | External Key invert on/off | | | |

# 4 Using the front control panel

## Module selected

This operational guide assumes that the panel has been set up according to the panel set up procedure described in the Crystal Vision Control Panel manual.

**Note:** It is **ESSENTIAL** that the panel set up procedure is followed and any old or unknown passwords cleared prior to using the panel for the first time.

At power up, the two-line 20-character screen will display ‘Crystal Vision’ followed by the firmware version number for the control panel. All eight control panel keys LEDs will illuminate.


*The Crystal Vision control panel start up display*

'Control Panel' then briefly replaces the version number display.


If the control panel firmware has been updated for Statesman control (version 1.5.0 or higher), Statesman Mode will be entered and the message, ‘Press CAL to Exit’ will be displayed and the CAL LED will light.


*Statesman mode is entered by default*

To continue with control panel operation or configuration, press the CAL key once. A second press of the CAL key will return to Statesman control.

The control panel will display the name of the card that first responds to the polling request together with its location number.

The location number consists of the frame number plus the card position in the frame.

## Navigating the display

The functions assigned to control panel keys are:

- DEVICE – enters Device menu to select a card or show cards available/enters panel set up when held down during power up/shows frame status when pressed from Statesman mode
- CAL – enters or leaves Statesman mode/enters panel diagnostics mode when held down during power up/updates the display
- Asterisk – enters board rename menu from the Device menu
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the home menu
- ENTER – accept current selection
- Upward arrow – used to move up the menu structure / enter lock panel menu from the Device menu
- Rotary control – shaft encoder used to select options or variable data

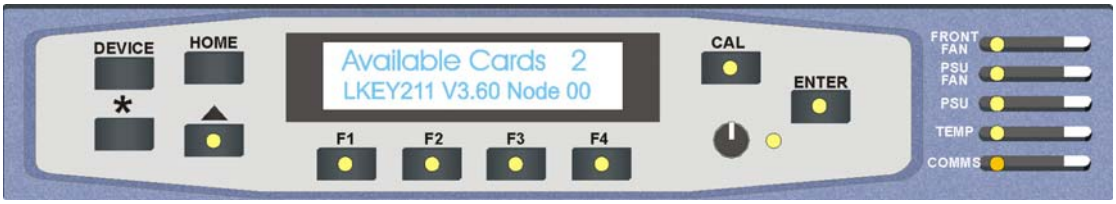
**Note:** Please refer to the Crystal Vision Control Panel manual for details of the Panel Setup, Lock Panel and Diagnostic menus.

## Selecting a LKEY211

To select a particular card in a frame, press the DEVICE key to go to the Device menu.

**Note:** There may be a delay whilst the frame is interrogated during which time the 'No cards Found' could be displayed.

The top line of the display will show 'Available Cards X', where X is the number of cards that have responded so far to the polling request.




*The available cards menu*

Rotate the shaft encoder and the bottom row will display the successfully polled cards by name and location or slot number.

In the example above, the card displayed is located in the first frame in slot number 1.

When the desired card is selected press the ENTER key to access that card's HOME menu. The message shows that a LKEY211 has been selected.


*The LKEY211 home menu*

**Note:** Ensure that DIL1 and DIL 4 are set for Active Panel control (DL1 DOWN and DL4 UP) to use the front control panel.

# 4.1 Navigating the display

The control panel keys are assigned the following functions when controlling the LKEY211:

- DEVICE – lists available modules in a frame
- Asterisk – no function assigned
- F1 to F4 – soft keys, function assigned within each menu
- HOME – moves the display to the home menu
- ENTER – selects module to control
- CAL – enter or leave statesman mode
- Upward arrow – used to move up the menu structure
- Rotary control – shaft encoder used to select options or variable data

## Updating the display

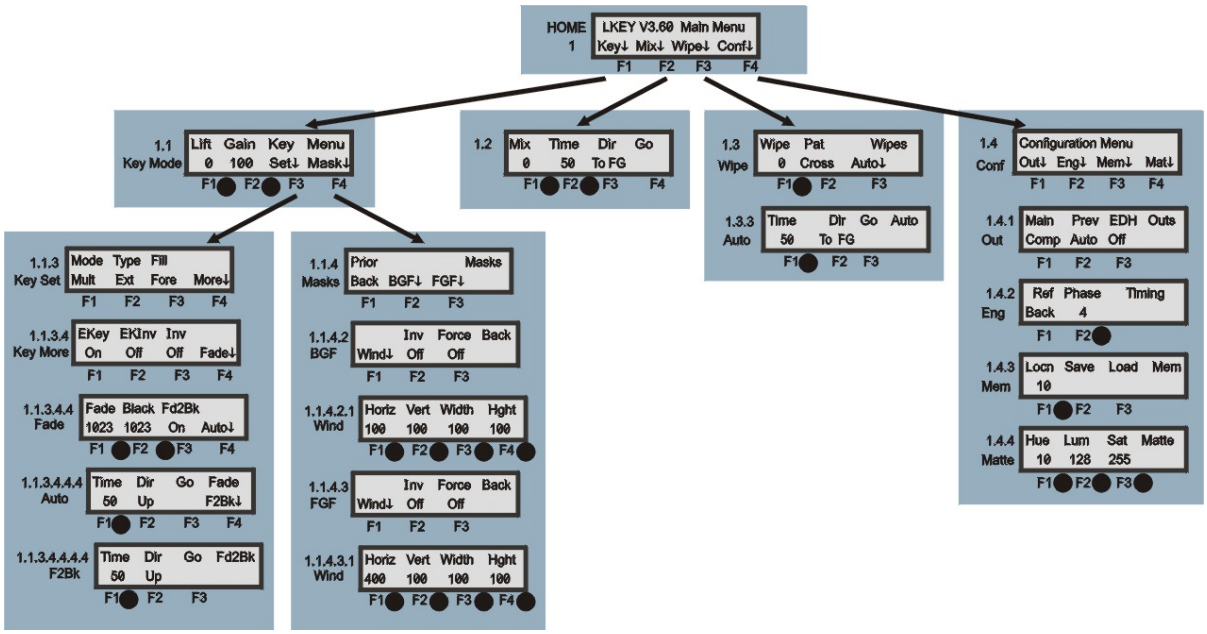
The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If mode changes occur through the use of card edge controls or through automatic response to the input video signal, the text displayed on the active front panel will not be updated immediately. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

# 4.2 The LKEY211 menu structure

The main top-level menus for a module are obtained by pressing the F1, F2, F3 and F4 keys from that module's HOME menu. Menu keys are illuminated when active and when further menus are available. The four top-level menus are:

- Key mode – press F1
- Mix mode – press F2
- Wipe mode – press F3
- Conf (Configuration) – press F4

The following chart shows the available LKEY211 menus.




The LKEY211 menu tree

**Note:** Function keys and shaft encoder LEDs are illuminated when active.
Menus or function keys associated with the shaft encoder are shown with a black circle.

## Menu numbering scheme

This manual uses a simple menu numbering convention based on the sequence of keys required to reach each menu from the top level home menu. For example, Menu 1.1.2 is reached from the home menu by pressing F1, then F2. Menu 1.2.3 is reached by pressing F2 and then F3.

## Selecting the operating mode

Pressing the appropriate function key from the HOME menu will select the operating mode:

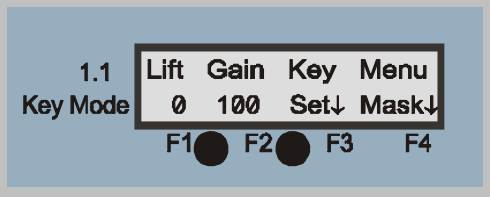
| Select the operating mode | Description |
|---|---|
|  | Press the function key under the required mode.<br>F1: Key mode<br>F2: Mix mode<br>F3: Wipe mode<br>F4: Configuration |

**Note:** The LKEY211 cannot be operated in more than one mode at a time. For example, mixing and keying cannot be performed together.

## Key mode

Pressing F1 from the HOME menu will bring up the main Key mode menu:

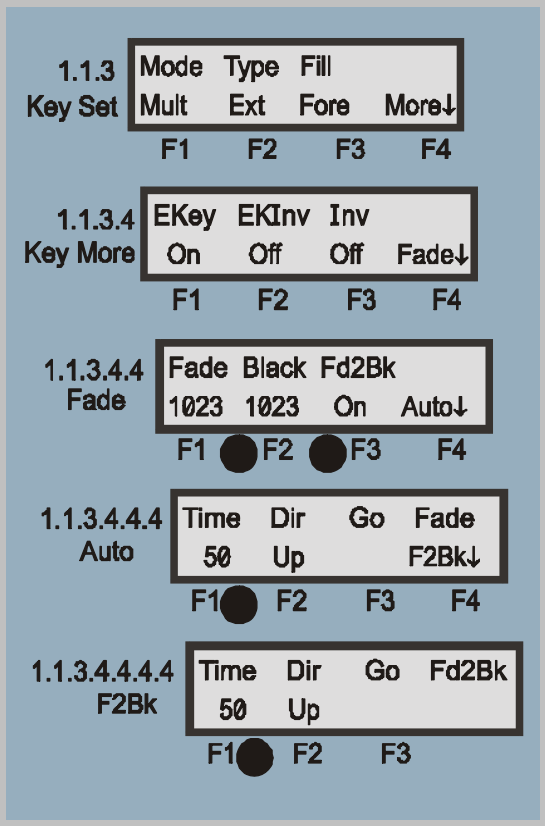
### Adjusting key gain and lift

| Phase menu structure | Description |
|---|---|
|  | Lift<br>Press F1 and rotate the shaft to increment and decrement the lift added to the key signal between –128 and 127.<br>Gain<br>Press F2 and rotate the shaft to increment and decrement key gain from zero to 4 times gain (399%).<br>Set Sub-menu<br>Press F3 to access additional parameters to set up further key signal options.<br>Mask Sub-menu<br>Press F4 to access and set up the force masks. |

**Note:** Negative lift reduces the ‘DC’ or brightness level of the video signal whilst positive lift increases it.
Use gain to increase or decrease the ‘contrast’ of the video signal.

## Selecting key mode, fill source and other options

Pressing F3 from the main key menu (1.1) will bring up the Key Set menu, which provides the following functions:

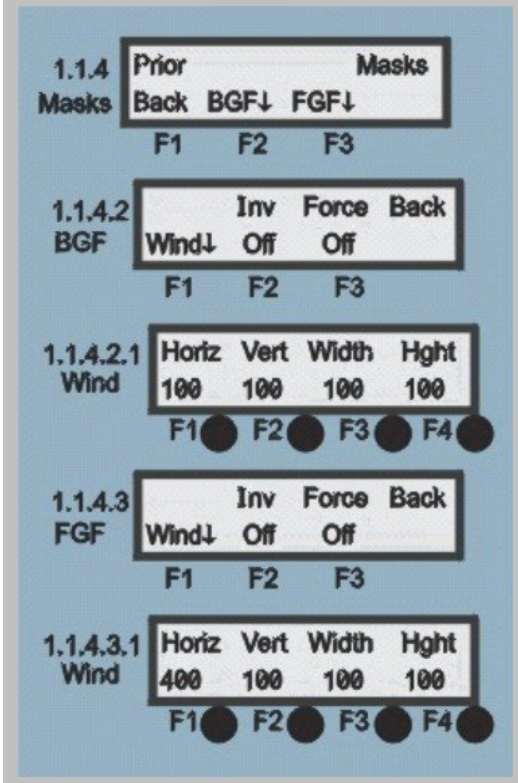
| Key menu structure | Description |
|---|---|
|  | F1 cycles through Add (Additive + key fade) and Mult (Multiplicative + key fade)<br>F2 toggles between external and self keying<br>F3 toggles available fill sources<br>F4 selects next menu<br><br>F1 turns External Key on or off<br>F2 inverts External Key<br>F3 inverts External Key and force masks<br>F4 selects Fade menu<br><br>F1 + shaft varies key fade from 0 to 1023<br>F2 + shaft varies FTB from 0 to 1023<br>F3 turns FTB on or off<br>F4 selects Auto menu<br><br>F1 + shaft varies fade time from 1 to 999 fields<br>F2 changes fade direction under automatic control<br>F3 starts an automatic transition<br>F4 selects FTB menu<br><br>F1 + shaft varies FTB fade time from 1 to 999 fields<br>F2 changes FTB direction under automatic control<br>F3 starts automatic FTB transition |

**Notes:**

Self-keying uses the Foreground luminance to key the Foreground into the Background.
Fill sources may be selected from the following: Digital black (Black), Foreground video (Fore), Background video (Back) and Matte which is the current colour from the internal Matte generator.
Turning the External Key off ensures that only force masks are used for keying.
A key fade value of 0 is fully faded down and a value of 1023 is fully faded up.
A FTB fade value of 0 means the output is fully faded to black and a value of 1023 means there is no fade to black.
Turning the FTB function off can be used to prevent accidental fade to black in live use.
A fade time value of 1 will perform an instant fade up or down.
When an automatic transition is finished the transition direction is automatically toggled to the opposite direction.

## Adjusting Mask options

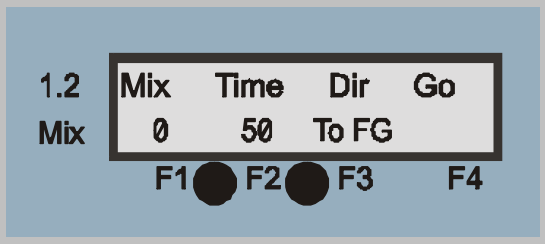
Independent masks are available to force selected rectangular areas of both the Foreground and Background video. The mask menu may be selected by pressing F4 from the main key menu 1.1.

| Masks menu | Description |
|---|---|
|  | F1 selects Background or Foreground mask priority<br>F2 selects the Background force mask sub-menu<br>F3 selects the Foreground force mask menu<br><br>F1 selects the Background force mask window menu<br>F2 inverts the Background force mask<br>F3 turns the Background force mask on or off<br><br>F1 + shaft varies horizontal mask position<br>F2 + shaft varies vertical mask position<br>F3 + shaft varies mask width<br>F4 + shaft varies mask height<br><br>F1 selects the Foreground force mask window menu<br>F2 inverts the Foreground force mask<br>F3 turns the Foreground force mask on or off<br><br>F1 + shaft varies horizontal mask position<br>F2 + shaft varies vertical mask position<br>F3 + shaft varies mask width<br>F4 + shaft varies mask height |

**Notes:** The priority setting determines whether the Background or Foreground force mask takes precedence when they overlap. When mask priority is set to fore the Foreground mask remains unmodified by the Background mask. If the masks overlap, the Foreground mask will control the area of overlap. When the priority is set to back the Background mask remains unmodified by the Foreground mask.

## Mix mode

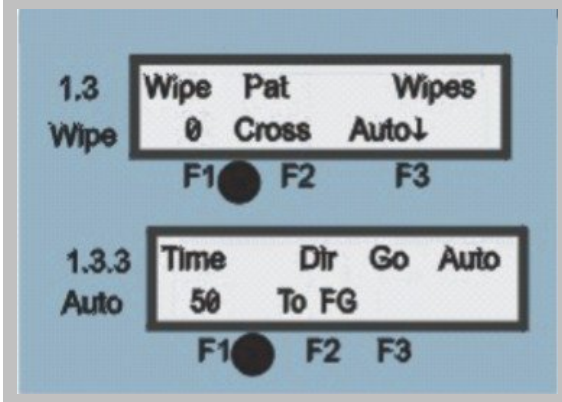
Pressing F2 from the HOME menu will bring up the Mix menu:

| Mix menu | Description |
|---|---|
|  | F1 + shaft varies the mix between Foreground and Background<br>F2 + shaft varies the mix transition duration from 1 field (instantaneous) to a maximum of 999 fields<br>F3 changes mix direction<br>F4 starts an automatic transition |

**Notes:** A fade time value of 1 will perform an instant fade up or down.
When an automatic transition is finished the transition direction is automatically toggled to the opposite direction.

## Wipe mode

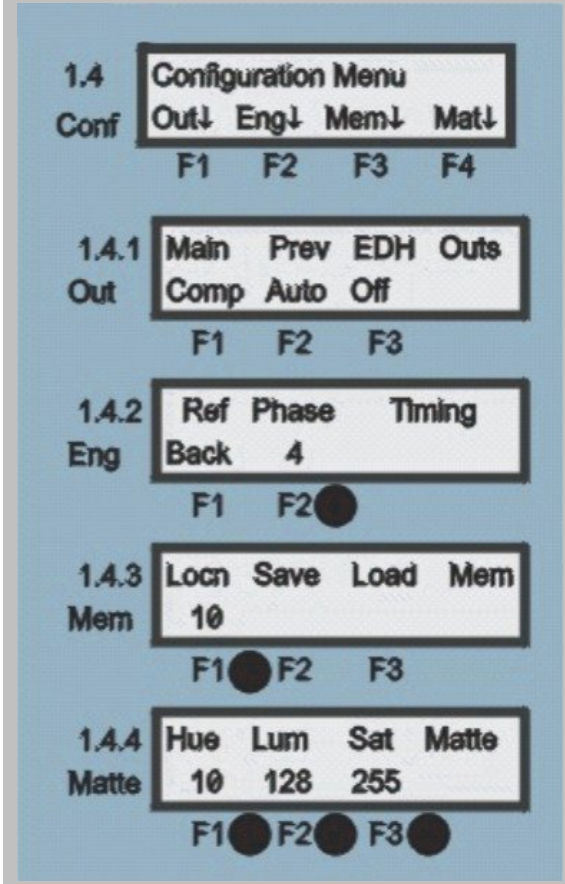
Pressing F3 from the HOME menu brings up the Wipe menu

| Wipe menu structure | Description |
|---|---|
|  | F1 + shaft selects amount between Foreground and Background<br>F2 selects wipe pattern<br>F3 selects automatic wipe menu<br><br>F1 + shaft varies the wipe transition duration from 1 field (instantaneous) to a maximum of 999 fields<br>F2 changes wipe direction<br>F3 starts an automatic transition |

**Notes:** A wipe time value of 1 will perform an instant wipe to the Foreground or to the Background.
When an automatic transition is finished the transition direction is automatically toggled to the opposite direction.

## Configuration mode

Pressing F4 from the HOME menu brings up the Configuration menu

| Configuration menu structure | Description |
|---|---|
|  | F1 selects main and preview Output menu<br>F2 selects Engineering menu<br>F3 selects settings Memory menu<br>F4 selects Matte menu<br><br>F1 selects video bus to route to main outputs<br>F2 selects video bus to route to the preview output<br>F3 turns main and preview EDH generation on and off<br><br>F1 selects input channel to be used as a timing reference<br>F2 + shaft varies horizontal delay in µs up to a maximum of 2 lines<br>See Note below for timing constraints<br><br>F1 + shaft selects memory location to store or recall settings – 10 locations available<br>F2 saves current setting to chosen location<br>F3 recalls settings stored in chosen location<br>N.B. The operation mode is also saved and recalled<br><br>F1 + shaft varies matte generator hue<br>F2 + shaft varies matte generator luminance<br>F3 + shaft varies matte generator saturation |

**Note:** Knob 1 adjusts the output delay relative to the input chosen as a reference. The delay changes approximately over a 126µs range from about 2µs to 128µs. The useful range of adjustment depends on the relative timing of the inputs. The setting should be adjusted so that the output is less than 128µs after the earliest input and more than 2µs after the latest input.

## Selecting Main and Preview output video bus source

The following video sources are available to route to the main and preview output in the Out menu:

| Source | Default | Description |
|---|---|---|
| **Auto** | Preview default | Selects video bus according to operational mode for preview output only – see Preview auto mode below |
| **Comp** | Main default | Comp sends the composite key with fill video to the preview output. |
| **Fore** | | Fore sends the Foreground video to the preview output. |
| **Back** | | Back sends the Background video to the preview output. |
| **KeyIn** | | KeyIn sends the External Key input to the preview output (including chrominance information if present). |
| **BGKey** | | BGKey sends the processed key signal to the preview output. |
| **Matte** | | Matte sends the internally generated matte to the preview output. |
| **Off** | | Off outputs digital black (main only) |

## Preview auto mode

In Key Mode, Auto sends the fully keyed composite video signal to the preview outputs when the key fade is zero. When the key fade is non-zero the composite key with fill video is sent to the preview outputs. However, if Foreground force is set to ON then the preview output will show the composite key with fill.

In Mix and Wipe Modes, Auto sends the Foreground video signal to the preview outputs when the transition is towards the Foreground. When the transition is towards the Background the Background video is sent to the preview outputs.

# 5 Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC.

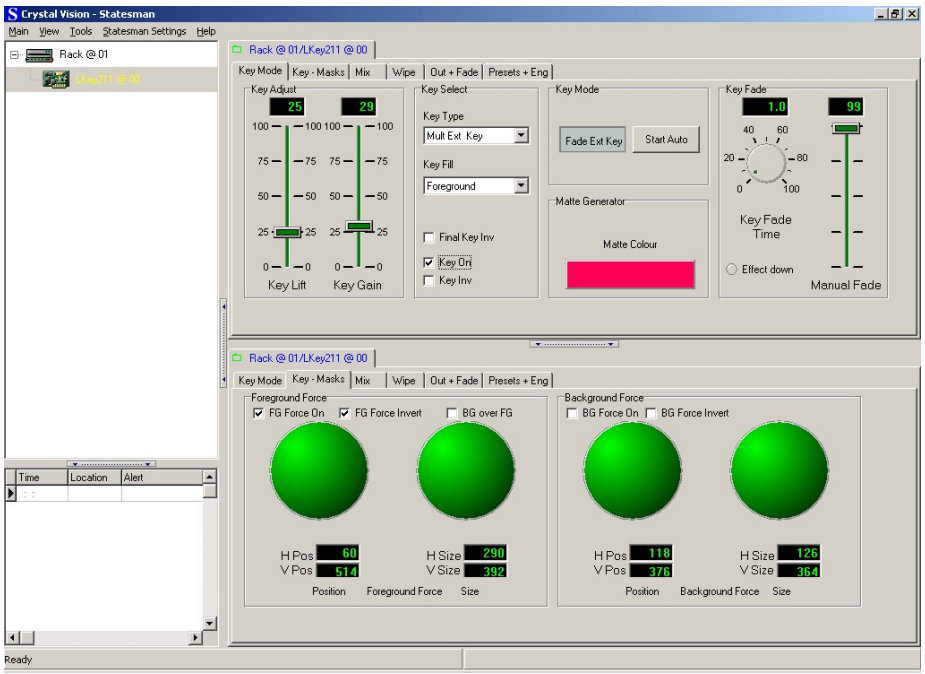
Statesman provides a user friendly means of configuring and operating Crystal Vision modules with the benefit of see-at-a-glance status monitoring.

The main Statesman application communicates with each module in a frame through an active control panel. An active panel must be fitted to allow for Statesman control.

## 5.1 Statesman operation

The initial view will show an explorer style view of the connected frames and modules. Open any frame by clicking on the '+' sign or by double clicking on a frame. Installed modules should be shown with module icons. Frame and module icons can be named as desired by right-clicking or using the edit menu.

Double clicking on a module will enable the display of the main application menus.



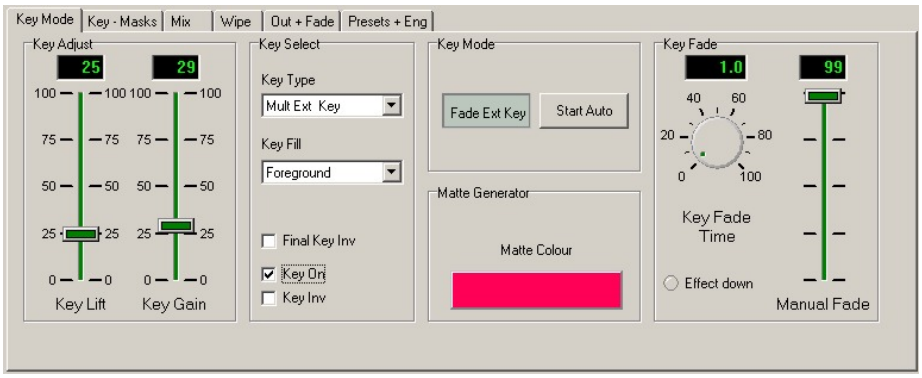

*The Statesman LEKY211 main application window*

The menu display is repeated for convenience to allow dual-module display, dual-control display of modules with duplicate signal paths or to allow two functions to be viewed at the same time.

**Note:** Features and controls that are inappropriate in certain modes or mutually exclusive with other controls will be automatically 'greyed out' to indicate that they are currently unavailable.

## Selecting key mode options

Use the Key Mode menu to select the type of keying operation required.




*LKEY211 Key Mode menu*

The following key modes are available:

| Function | Description |
|---|---|
| **Add Ext Key** | Additive mode with an External Key |
| **Mult Self Key** | Multiplicative mode with an External Key |
| **Add Self Key** | Additive mode with a Self-key |
| **Mult Self Key** | Multiplicative mode with a Self-key |

The following fill sources are available:

| Function | Description |
|---|---|
| **Black** | Fill source is taken from the black generator |
| **Foreground** | Fill source is taken from the Foreground input |
| **Background** | Fill source is taken from the Background input |
| **Matte** | Fill source is taken from the matte generator |

The following key adjustments are available:

| Function | Description |
|---|---|
| **Key Lift** | Key lift defines a luminance level below which the key will be zero. |
| **Key Gain** | Key Gain defines a luminance level above which the key will be full amplitude. |

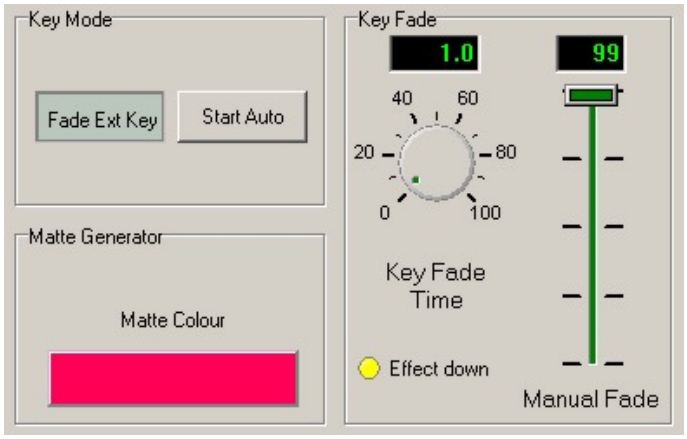
**Note:** The minimum difference between Min Clip and Max Clip is 12%.

## Using fade controls

The fade controls consist of an on-screen slider which acts like a ‘T-bar’, a Fade Disable/Enable button, a Start Auto button and a Fade Time control to set the automatic fade duration.

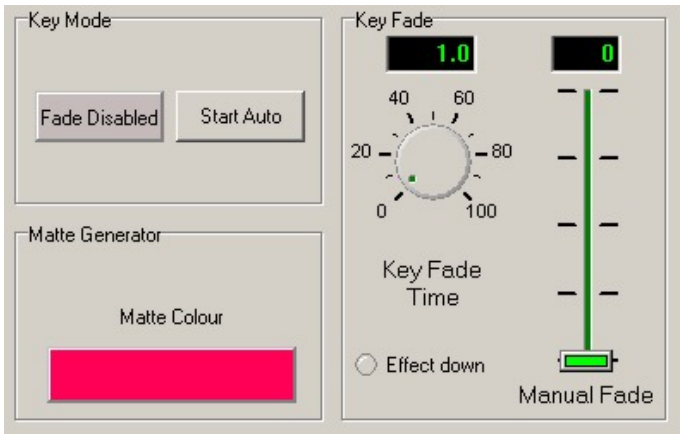
### Fading keys

The key mode fade controls are only active if an external or Self-key is active.




*LEKY211Key Mode menu – fade options*

Enabling a fade to black, a mix or a wipe will disable the fade function in this menu.




*Safire Key Mode menu – CKey/Self-key disabled*

To enable the key fade function directly, click on the Fade Disabled button in the Key Mode menu. When disabled, the button will have a faint purple Background, when enabled the Background will turn green.

The fade may be initiated by using the Manual fade slider or by pressing the Start Auto button, when the fade will occur at a rate set by the Fade Time control. If the Start Auto button is pressed during a timed transition, its effect will be reversed.

The default effect of the fade function (manual or automatic fade down) is to fade the active keyed video off the screen leaving the Background signal.

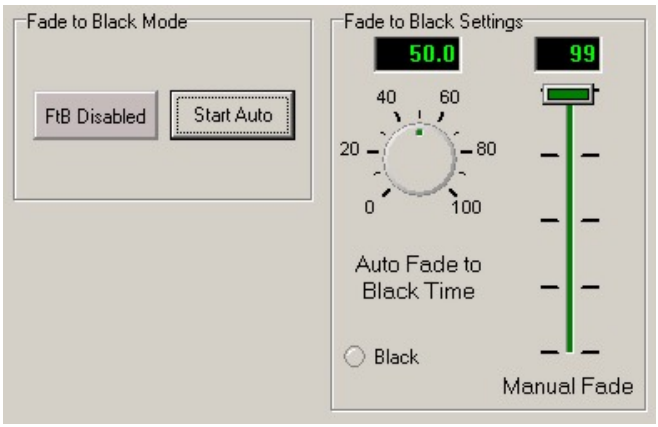
The ‘fade-to’ source is normally Background, but this may be overridden by inverting key signals.

**Tip:** To change the FADE TO source from Background to Foreground, invert both the active and combined keys.

The Key Down indicator always shows the fully off state of the assigned fade function (i.e. external or Self-key).

## Fade to Black controls

The Fade to Black controls are only active if they have been enabled in the Out + Fade menu.




*LKEY211 FTB settings*

To enable the key fade function directly click on the FtB Disabled button in the Out + Fade menu. When disabled, the button will have a faint purple Background, when enabled the Background will turn green.

The Fade to Black Settings box shows the setting for the automatic fade time (0 to 100 fields) and the position of the manual on-screen ‘T-bar’ fader.

The fade may be initiated by using the Manual fade slider or by pressing the Start Auto button, when the fade will occur at a rate set by the Auto Fade to Black Time control.

The Black indicator shows the fully off state of the Main output i.e. black

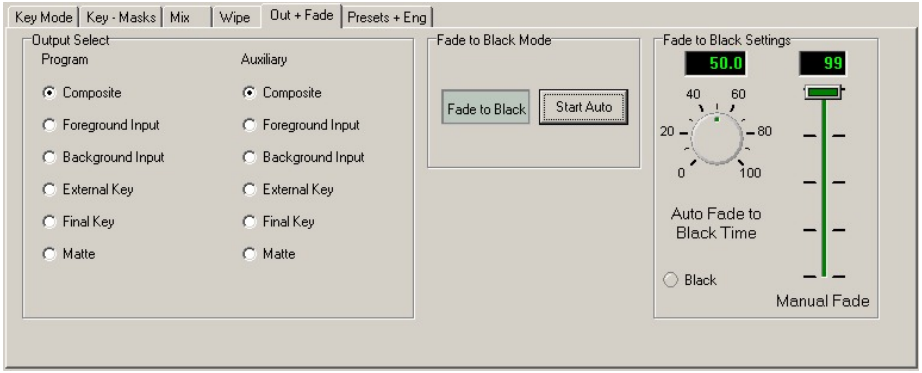
Pressing the Start Auto key during a Fade to Black transition reverses the direction of the transition.

**Note:** Fade to Black is only available on the main output.

## Selecting the main and auxiliary output source

There are a number of sources, which may be assigned to the Main, and Auxiliary outputs to assist with the construction and operation of keying and mix/wipe operations.

Use the Out + Fade menu to select the source for the Main and Auxiliary outputs.




*LKEY211 Out + Fade menu*

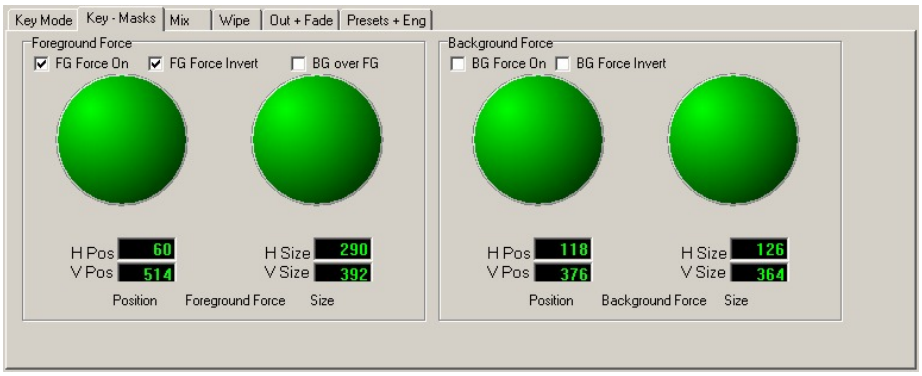
The Main and Auxiliary outputs may be assigned to sources as follows:

| Function | Notes |
|---|---|
| **Composite** | Selects the final combined video image. |
| **Foreground Input** | Selects the Foreground input. |
| **Background Input** | Selects the Background input |
| **External Key** | Selects the External Key input |
| **Final Key** | Selects the combined key. This will be a combination of some or all of External Key input, Foreground mask and Background mask. |
| **Matte** | Selects the output of the Matte generator |

**Tip:** The matte colour may be observed whilst selecting its colour on the Main or Auxiliary output by selecting Matte as the output source or by using it as the fill in an active key, and viewing the composite output.

## Using Masks

Both Foreground and Background masks are provided which can be used with any of the valid key combinations to force or censor elements of both the Background and Foreground. The priority of each mask can be changed.




*LKEY211 Key Masks menu*

| Masks | |
|---|---|
| **FG Force On** | Enables Foreground mask. When the mask is on, the area it occupies is forced to Background |
| **FG Force Invert** | Inverts Foreground mask |
| **BG Force On** | Enables Background mask. When the mask is on, the area it occupies is forced to unsuppressed Foreground. |
| **BG Force Invert** | Inverts Background mask |
| **BG over FG** | Selects, which mask window, have control in areas where they overlap. Leaving BG over FG unchecked results in unsuppressed Foreground in the area of overlap. Checking BG over FG results in Background in the area of overlap. |
| **Hpos Fgnd/Bgnd Force** | Adjusts the position of the left-hand edge of the window. Value is the digital pixel number of the edge. |
| **Vpos Fgnd/Bgnd Force** | Adjusts the position of the top edge of the window. The displayed value is in lines. |
| **H Size Fgnd/Bgnd Force** | Adjusts the mask width in pixels. |
| **V Size Fgnd/Bgnd Force** | Adjusts the mask height in lines. |

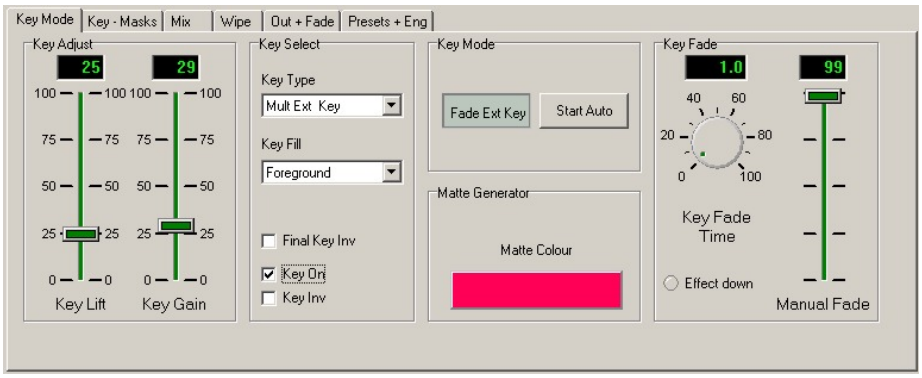
It may help to slightly misadjust key lift and gain to make a mask window more visible during mask adjustment.

If an External Key and force masks are enabled they are combined with a non-additive mix.

When external/self keys are turned off internal masks can be used solely as the keying source.

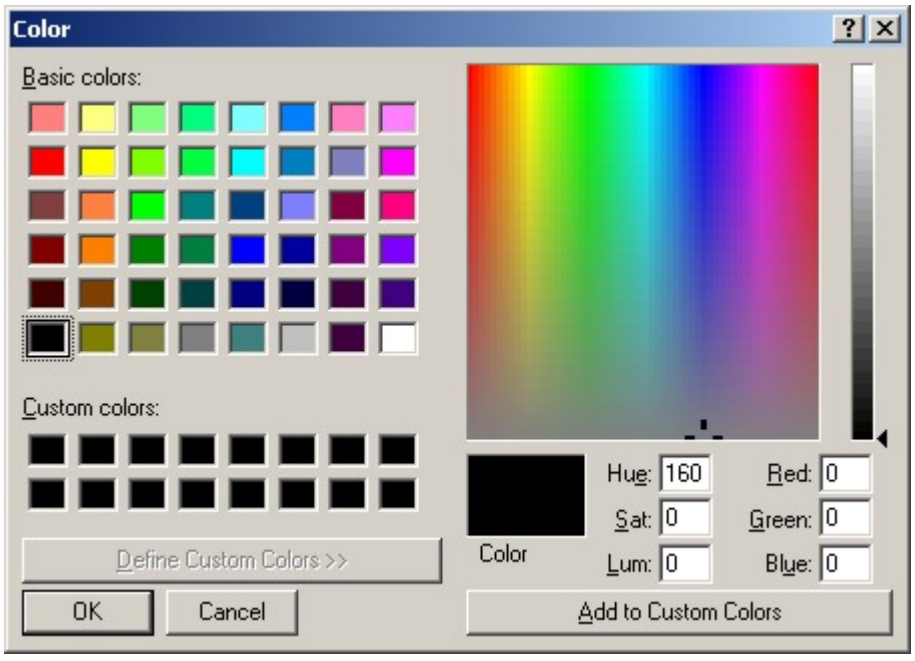
## Selecting the matte colour

The select Matte colour menu is located within the Key External menu.




*LKEY211 Key External menu*

Click on the Matte Colour button to bring up the Matte Colour selector.



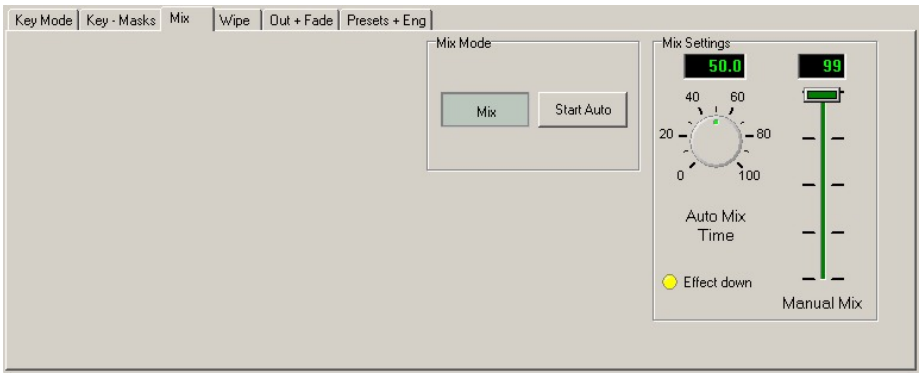

*Matte colour select sub-menu*

Matte processing limits the matte output based on RGB or HLS values to generate only legal colours in the YCrCb colour space.

**Note:** One effect of the built in colour-space legaliser (matte processing) is that luminance and chrominance values are cross-linked. For example, displayed luminance is reduced as saturation is increased and saturation is reduced to if a higher luminance value is required.
The displayed numerical values of the standard windows colour selector may not reflect the limited range of values legal in broadcast television colour-space. However, Safire's matte processor will NOT output illegal colours.

## Using mixes

To enable Mix mode, enter the Mix menu and click on the Mix Disabled button to toggle it to Mix. When disabled, the button will have a faint purple Background, when enabled the Background will turn green.



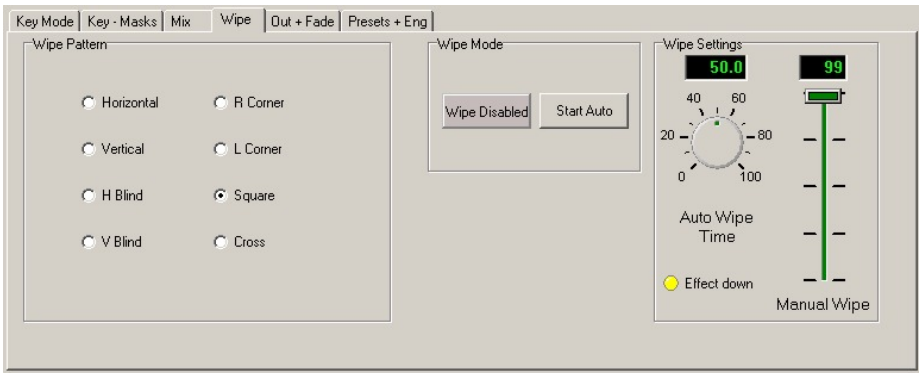

*LKEY211 Mix menu*

The mix Settings box shows the setting for the automatic fade time (0 to 100 fields) and the position of the manual on-screen 'T-bar' fader.

The Effect Down indicator always shows the fully off state of the mix. Pressing the start auto key during a transition reverses the direction of the transition.

## Using wipes

To enable Wipe mode, enter the Wipe menu and click on the Wipe Disabled button to toggle it to Wipe. When disabled, the button will have a faint purple Background, when enabled the Background will turn green.




*LKEY211 Wipe menu*

The Wipe Settings box shows the setting for the automatic fade time (0 to 100 fields) and the position of the manual on-screen 'T-bar' fader.

The Effect Down indicator always shows the fully off state of the assigned wipe function.

Pressing the Start Auto key during a transition reverses the direction of the transition.

### Wipe patterns

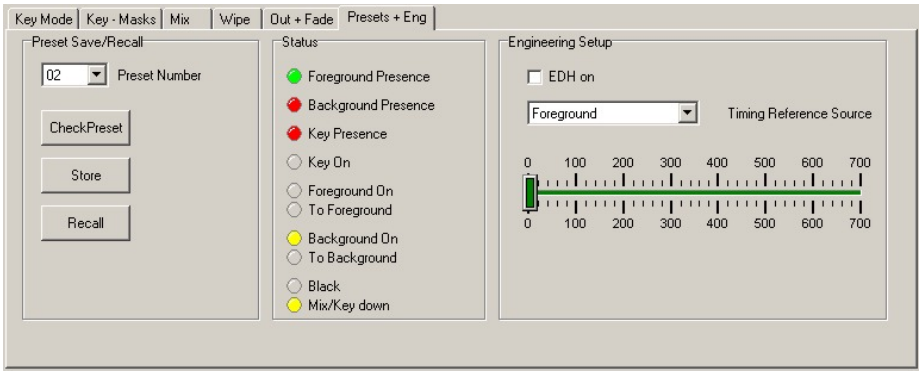
The available wipe patterns are as shown in the following table:

| | | | |
|---|---|---|---|
|  | Vertical |  | Left Corner |
|  | Horizontal |  | Right Corner |
|  | Vertical Blind |  | Box |
|  | Horizontal Blind |  | Cross |

*LKEY211 Wipe Patterns*

## Using presets

Up to ten setups may be stored and recalled from Statesman, the Safire Controller or by an active control panel.




*Safire Presets + Eng menu*

Presets store configuration data, but not names, which may have been set via the Safire controller panel. Statesman presets are numbered 1-10.

To store a preset proceed as follows:

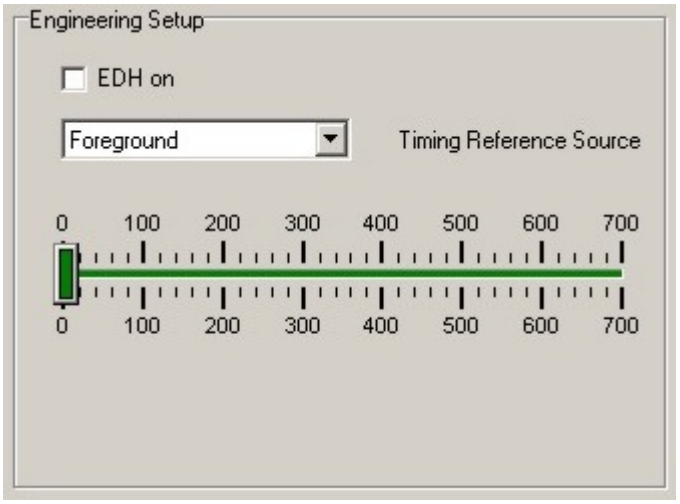
- Select an appropriate preset with the Preset Number drop-down menu
- Click on ‘Check Preset’ to find an empty preset
- Click on ‘Store’ to save setup data into the selected preset

To recall a preset proceed as follows

- Select an appropriate preset with the Preset Number drop-down menu
- Click on ‘Recall’ to recall setup data from the selected preset

## Configuring engineering setup

The ENG menu, which is co-located with the Presets menu, provides access to, Horizontal Delay, EDH on/off and Timing Reference Source select.




*LKEY211 ENG menu*

| Function | Notes |
|---|---|
| **Timing reference source** | Click on the pull-down list to select the output timing reference from Foreground, Background or External Key. |
| **EDH** | Turn EDH checking on/off |
| **H Phase** | Adjusts output delay relative to selected reference over a 126µs range from about 2µs to 128µs. Acceptable range depends on relative timing of input signals. |

On power up the LKEY211 module restores all the settings, including H Phase, to the value they were when a set-up was last stored. If the value of H Phase is subsequently adjusted the new value will not be overwritten when a set-up is recalled unless the recalled set-up was the last one to be saved.

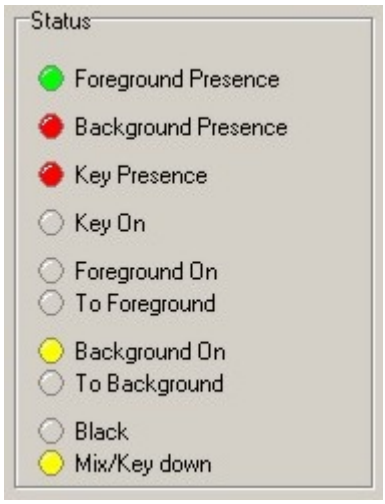
This allows the user to recover a previous H Phase value if required and to recall set-ups without overwriting an H Phase adjustment that has changed to cope with different input signal timing.

If the H Phase value is changed to accommodate external timing then storing a set-up after the adjustment will prevent an unexpected reversion to the old value.

**Note:** Output timing is selectable with 0-2-line delay from the assigned reference input. The other inputs must be 0-2 lines earlier than the output. Inputs outside the timing range will be horizontally aligned but vertically offset.

## LKEY211 status

Statesman provides basic status information within the Presets + ENG menu




*Statesman status display for the LKEY211*

| Function | Colour On/present | Colour Off/absent | State when on/present/active |
|---|---|---|---|
| **Foreground Presence** | Green | Red | Foreground input present |
| **Background Presence** | Green | Red | Background input present |
| **Key Presence** | Green | Red | External Key input present |
| **Key On** | Yellow | Greyed out | External Key in use |
| **Foreground On** | Yellow | Greyed out | Foreground contributing to output |
| **To Foreground** | Yellow | Greyed out | Fader set to 'Fade to Foreground' |
| **Background On** | Yellow | Greyed out | Background contributing to output |
| **To Background** | Yellow | Greyed out | Fader set to 'Fade to Background' |
| **To FG** | Yellow | Greyed out | Fade to source is Foreground |
| **To BG** | Yellow | Greyed out | Fade to source is Background |
| **Black** | Yellow | Greyed out | Output is faded to black – FTB active and faded down |
| **Mix/Key Down** | Yellow | Greyed out | Mix or Key is active and faded down |

**Tip:** To change the FADE TO source from Background to Foreground, invert both the active and combined keys.

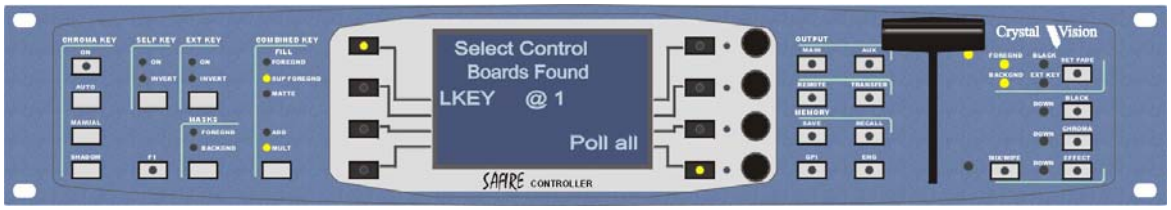
# 6 The Safire Controller

The Safire Controller panel provides convenient access to keyer and mixer functions with a combination of direct access keys and assignable or 'soft' controls. A bright seven line dot-matrix display ensures high visibility and both manual and timed transitions have dedicated controls.

## 6.1 Using the controller panel

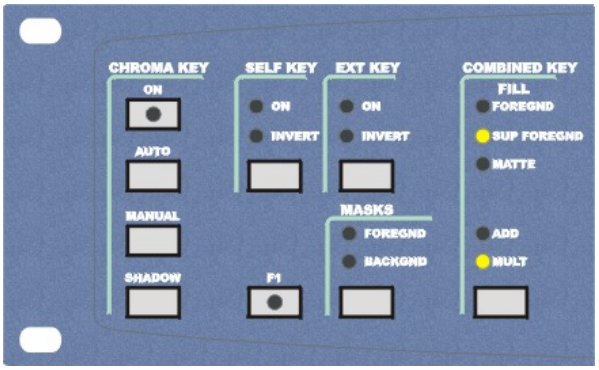
Besides a T-Bar to perform transitions, direct access keys include dedicated buttons for direct menu entry keys, and timed functions such as black fades, effects such as mixes and wipes. Four soft rotary controls allow numeric data to be easily assigned to variables.

Use of the Safire Controller panel requires setting the board edge DIL switch levers 1 and 4 both DOWN. Specific jumper settings may also be required as explained in the Installation chapter.




*Safire Controller panel showing rack mount ears*

The very left group of buttons under the heading Chroma Key are only used when controlling a Safire Chroma keyer. When controlling an LKEY these buttons bring up a status display. The F1 button provides access to the panel-lock/unlock menu.




*Keying, Masks, Fill Source and panel lock/unlock controls*

The remaining buttons in this group provide direct access to LKEY menus such as Self-key, Ext Key, Masks and Combined Key.

The available functions are summarised in the following tables:

## Chroma Key

This button group is assigned Chroma key functions only when the Safire Controller is used with a Safire linear Chroma keyer module. When used with the LKEY211 the buttons in this group bring up the current LKEY211 status (i.e. Location, Self/External Key on/off, Masks on/off, Add/Mult mode).

## Self Key

| Button | Function | Notes |
|---|---|---|
| Self Key | Enters Self Key menu | Self Key LED illuminates when self key is on<br>Invert LED illuminates when self key is inverted |

## Ext Key

| Button | Function | Notes |
|---|---|---|
| Ext Key | Enters Ext Key menu | Ext Key LED illuminates when External Key is on<br>Invert LED illuminates when External Key is inverted |

## Combined Key

| Button | Function | Notes |
|---|---|---|
| Com Key | Enters Combined Key menu<br>Select Fill Source | Foregnd, Backgnd or Matte fill source LED illuminates when selected |
| | Select Add/Mult keyer type | Add or Mult key type LED illuminates when selected |
| | Invert Final Key | Invert the final or combined key |

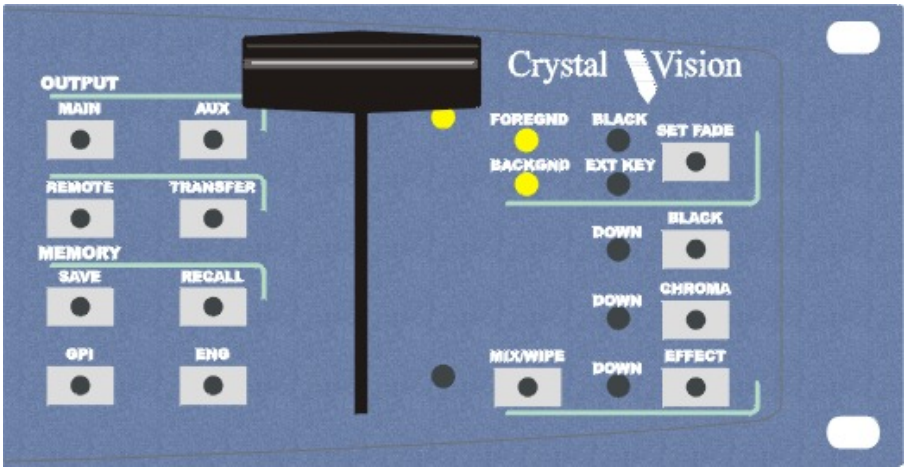
## Masks

| Button | Function | Notes |
|---|---|---|
| Masks | Enters Masks menu | Foregnd Mask LED illuminates when Foreground mask is on<br>Backgnd LED illuminates when Background mask is on |

## Panel Lock/Unlock

| Button | Function | Notes |
|---|---|---|
| F1 | Enters panel/lock/unlock menu | Password is stored in NVRAM and is displayed on first entering menu after power up. |

The button groups to the right of the T-Bar are the Set Fade enter-menu button and the Black, Effect and Mix/Wipe direct action transition buttons. The groups to the immediate left of the T-Bar comprise the Output, Remote, Transfer, GPI, ENG and Memory enter-menu buttons.




*Live controls, fader/output assignments and engineering menus*

The available functions are summarised in the following tables:

## Output

| Button | Function | Notes |
|---|---|---|
| Main | Enters Main Output source select menu | Choose from Fg Input, Bg Input, Ext Key, Composite, Final Key or Matte |
| Aux | Enters Auxiliary Output menu | As Main |
| Remote | Enters Remote menu | Assign Safire Controller to LKEY module |
| Transfer | Enters Transfer menu | Copy Setup between LKEY modules |

## Memory

| Button | Function | Notes |
|---|---|---|
| Save | Enters Save Configuration menu | Ten named presets available |
| Recall | Enters Recall Memory menu | Ten named presets available |
| GPI | Shows LKEY211 status | LKEY211 does not support GPI recall of saved presets. |
| ENG | Enters Engineering menu | Input status, Ref Select, H Phase and Display brightness |

## Set Fade

| Button | Function | Notes |
|---|---|---|
| Set Fade | Enters Set Fade menu | Assign T-Bar fade function. Select transition time for auto - transition buttons. LED confirms fade-to source selected. |

### Transition buttons

| Button | Function | Notes |
|---|---|---|
| Black | Initiates a Fade to Black | Transition time set in Set Fade menu |
| Chroma | No function assigned | Supported by Safire module only |
| Mix/Wipe | Enters Mix/Wipe mode and Mix/Wipe menu | Transition time set in Set Fade menu<br>Mix or Wipe and wipe effect selected in Mix/Wipe menu. Down LED illuminates when transition is fully active. |
| Effect | Initiates a Mix or a Wipe when in Mix/Wipe mode<br>Initiates External Key fade in any other mode | Transition time set in Set Fade menu<br>Mix or Wipe and wipe effect selected in Mix/Wipe menu. Down LED illuminates when transition is fully active. |

If a transition button is pressed during a timed transition, its effect will be reversed.

### T-Bar

| Control | Function | Notes |
|---|---|---|
| T-Bar | Manually controls Mix/Wipe/Key/Fade | Fade up or Fade down LED illuminates at end stops. |

The T-bar 'end-stop' LEDs always show the electronic state of the assigned fade function. If an end-stop LED shows that the T-bar is 'at the wrong end', it can be moved to the lit position, *without affecting the program output*.

The video faded in or out by the T-bar transition button is dependent on which keys are currently active. It is possible to have two keys active at any one time.

## 6.2 Using the display and soft controls

The display is used together with eight soft buttons and four soft rotary controls. The function assigned to each is entirely dependent on the currently active menu.


*Safire Controller assignable controls*

An LED within the soft buttons or just to the left of the rotary controls always indicates the active controls.


*Button LEDs show rotary control assignment*


*Button LEDs on left show rotary control assignment*

If there are more variables than can be displayed on one menu, a MORE button is used to access additional menu(s).

## 6.3 Getting started

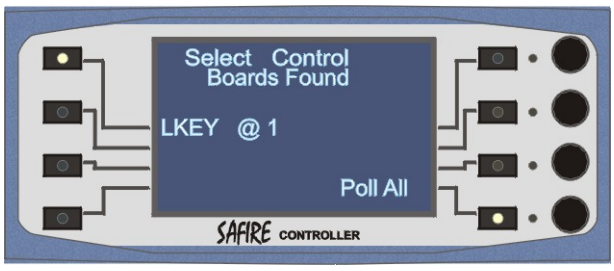
Ensure that the Safire Controller is connected to the appropriate remote connector of a Crystal Vision rack containing one or more LKEY211 or Safire units and apply power to both controller and rack. Refer to sections 8.5 and 8.6 of the Installation chapter for cable connection details.

For these examples at least two synchronous video inputs will be needed, a Background image connected to the BG IN connector, a Foreground input connected to the Foreground input or an SDI input connected to the External Key input.

**Tip:** An External Key will be mandatory if the Ext Ref is set to use the Ext Key input as a reference (refer to the ENG menu).


*Controller Polling for controllable module (power on default)*

At power-up all LEDs illuminate for a few seconds whilst the Safire controller polls for available LKEY (or Safire) modules. If one or more module(s) respond during this time it (they) will be listed.




*LKEY211 module found in slot 1*

If necessary press Poll All to search for modules in connected frames.

**Tip:** The LKEY module may take longer to initialise from power up than the panel's polling time-out.

Select the desired module to control. The Poll All command can be found by pressing the REMOTE button at any time.

Now that the Safire controller has found an LKEY211 module, we are ready to learn about the operational menus.

# 6.4 Safire LKEY211 menus

This chapter describes the LKEY211 operational, engineering and status menus when using the Safire Controller.

## Output source

The MAIN and AUX (Preview) output assignment functions allow a number of internal video signals to be monitored in addition to the COMPOSITE output.


*Main output assignment – composite output selected*


*Auxiliary output assignment – final (combined) key selected*

Enter the Main Output source-select menu with the OUTPUT button, or the Auxiliary Output source-select menu with the AUX button.

Select the desired signal from the eight available with the appropriate soft button. The chosen signals will be highlighted in CAPITAL letters and the appropriate soft-button LED will illuminate.

| Function | Notes |
|---|---|
| **Fg Input** | Selects the Foreground input. |
| **Bg Input** | Selects the Background input |
| **Ext Key** | Selects the External Key input |
| **Composite** | Selects the combined video image. |
| **Final Key** | Selects the combined key. This will be a combination of some or all of External Key input, Foreground mask and Background mask. |
| **Matte** | Selects the matte signal to facilitate setting its colour. |

The Main output is identical to the Auxiliary output, apart from the fact that the Auxiliary output has no FTB function.

## Assigning fade controls

The Set Fade menu allows the fade function to be assigned.

The type and duration of timed fades can be selected using the SET FADE button.


*Set Fade in Mix/Wipe mode*


Set Fade in Keyer mode

Assign a function to the T-Bar and select a duration for an auto-transition. The available choices depend on the current LKEY mode.

### Fade Key

Selecting Fade Key in keyer mode allows the selected key to be faded down using the T-bar or timed transition. If Black is chosen, the T-bar operates a Fade to Black.

The 'Down' indicator is lit when the effect of a key is not contributing to the output.

The fade may be initiated by using the T-bar or by pressing the Effect button when the fade will occur at a rate set by the Go button time.

#### *Changing the FADE TO source*

In keyer mode, the fade-to source is normally Background, but this may be overridden by inverting the Combined Key. If the active key is also inverted, a fade to Foreground will occur.

**Tip:** To change the FADE TO source from Background to Foreground, invert both the active and combined keys.

### Mix or wipe

Selecting Mix or Wipe in MIX/WIPE mode allows the selected function controlled using the T-bar or timed transition. If Black is chosen, the T-bar operates a Fade to Black.

The 'Down' indicator is lit when the mix or wipe is not contributing to the output.

The effect or fade may be initiated by using the T-bar or by pressing the Effect button when the mix, wipe or fade will occur at a rate set by the Go button time.

## Mix/Wipe mode

The Mix/Wipe mode, entered by pressing the MIX/WIPE key, enables mixing or wiping from Foreground to Background or Background to Foreground with the following controls:

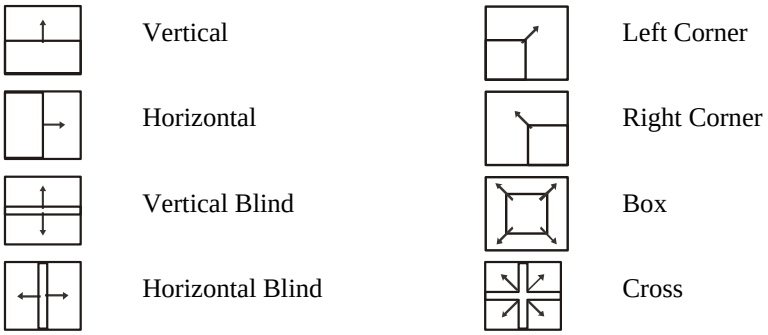
- Manual with the T-bar
- Automatic or 'timed' with the EFFECTS key


*Select MIX or WIPE transition*


Select pattern for wipe

| Function | Notes |
|---|---|
| **Mix** | Select mix transition |
| **Wipe** | Select wipe transition |
| **Mix/Wipe on** | Mix/Wipe status |
| **Select wipe pattern** | Use next menu to select wipe pattern |

The available wipe patterns are as shown in the following table:




*Wipe Patterns*

Pressing the EFFECTS key again during a transition reverses the direction of the transition.

MIX/WIPE mode will prevent any keys or masks that may have been set from contributing to the output, but will not erase any settings.

**Note:** To exit MIX/WIPE mode select a key mode.

## Self-key

A Self-key is produced using the luminance or black and white information of the Foreground video. This mode is often used with the output from a character generator that does not supply a key output.


*Self-key Off/On*

Self-key options:

| Function | Notes |
|---|---|
| **Off/On** | Off – inactive, On – active |
| **Invert** | Inverts the Self-key, capitalised when active: INVERT |
| **Min/Max Clip** | Max Clip defines a Luma level above which the key will be full amplitude. Min Clip defines a Luma level below which the key will be zero. The minimum difference between Min Clip and Max Clip is 12%. |

Luminance Self-keys can be combined Foreground and Background masks.

## Ext key

The External Key is produced using the luminance or black and white information of the external video. External Keys can be combined with Foreground and Background masks.


*External Key defaults*

| Function | Notes |
|---|---|
| **On/Off** | Enable or disable the External Key |
| **Min/Max Clip** | Max Clip defines a Luma level above which the key will be full amplitude or 100%. Min Clip defines a Luma level below which the key will be zero. The minimum difference between Min Clip and Max Clip is 12%. |
| **Invert** | Invert the External Key signal |

## Mask setup

Both Foreground and Background masks are provided which can be used with any of the valid key combinations to force or censor elements of both the Background and Foreground. The priority of each mask can be changed.


*Foreground Mask Setup*


*Background Mask Setup*

| Masks | |
|---|---|
| **Fg Off/On/Invert** | Enables disables or inverts Foreground mask. When the mask is on, the area it occupies is forced to Background |
| **Bg Off/On/Invert** | Enables, disables, inverts Background mask. When the mask is on, the area it occupies is forced to unsuppressed Foreground. |
| **Priority F/B** | Selects, which mask window, have control in areas where they overlap. A selection of 'F' results in unsuppressed Foreground in the area of overlap. A selection of 'B' results in Background in the area of overlap. |
| **Adjust Fg/Bg** | Mask controls alter Fgnd or Bgnd |
| **Hpos** | Adjusts the position of the left-hand edge of the window. Value is the digital pixel number of the edge. |
| **Vpos** | Adjusts the position of the top edge of the window. The displayed value is in lines. |
| **Width** | Adjusts the mask width in pixels. |
| **Height** | Adjusts the mask height in lines. |

It may help to slightly misadjust Max/Min Clip to make a mask window more visible during mask adjustment.

If an External Key and force masks are enabled they are combined with a non-additive mix. This means that if a mask and the External Key are both forcing Background, where they overlap the signal that forces Background most strongly will take priority.

The priority setting determines whether the Background or Foreground force mask takes precedence when they overlap. When the priority is set to 'F' the Foreground mask remains unmodified by the Background mask (if the masks overlap the Foreground mask will control the area of overlap). When the priority is set to 'B' then the Background mask remains unmodified by the Foreground mask.

When External and Self-keys are turned off internal masks can be used as the only keying source. When turned on, either the External Key or the Self-key can be combined with internal masks.

## Combined key

This menu provides access to Fill Source selection, Set Matte, Add/Mult mode change and invert/normal the Combined Key.


*Combined Key*

| Function | Notes |
|---|---|
| **Foreground** | Select Foreground as Fill Source. Capitalised when selected. |
| **Background** | Select Foreground as Fill Source. Capitalised when selected. |
| **Matte** | Select matte as Fill Source. Capitalised when selected. |
| **MULT/Add** | Select additive or multiplicative keying |
| **Invert** | Invert the Final Key signal |
| **Set Matte** | Select Matte colour – see next menu |

### Set matte

The matte colour can be viewed by selecting it as the fill with a key active whilst monitoring the Main or Aux output or simply by assigning Matte to either output.


*Combined Key – Set Matte*

| Function | Notes |
|---|---|
| **Hue** | Select Hue 0 to 360degrees |
| **Luminance** | Select luminance value 0 to 100 |
| **Saturation** | Select saturation 0 to 100 |

Matte processing limits the matte output based on RGB values to generate only legal colours in the YCrCb colour space.

**Note:** One effect of the built-in colour-space legaliser is that luminance and chrominance values are cross-linked. For example, luminance is reduced as saturation is increased and saturation has to be manually reduced if a higher luminance value is required.
The displayed numerical values reflect the limited range of values legal in broadcast television colour-space.

## Remote

This menu is entered with the REMOTE button and upon initial panel power-up.


*Controller Polling for modules (power on default)*


*LKEY211 found at frame slot 1*

At power-up, or when the Poll All soft button is pressed, the Safire controller polls for available modules. If one or more module(s) respond during this time it (they) will be listed. Select the required LKEY211 module with the appropriate soft button.

## Engineering

This menu is entered with the ENG button.


*Controller Polling for Safire module (power on default)*

| Function | Notes |
|---|---|
| **Eng Vers** | Displays software version |
| **Fgnd** | Shows presence or absence of Foreground input |
| **Bgnd** | Shows presence or absence of Background input |
| **Ext Key** | Shows presence or absence of selected output timing reference or External Key input |
| **Ref** | Toggles through the inputs to select the output timing reference |
| **625/525** | Shows input standard |
| **Bright** | Adjust brightness over 0 (half range) to 3 (full range) |
| **Defaults** | Recall factory defaults |
| **H Phase** | Adjusts output delay relative to selected reference over a 126 microsecond (µs) range from about 2µs to 128µs. Acceptable range depends on relative timing of input signals. |

On power up settings are restored, including H Phase, to the value they were when a set-up was last stored. If the value of H Phase is subsequently adjusted the new value will not be overwritten when a set-up is recalled unless the recalled set-up was the last one to be saved. This allows the user to recover a previous H Phase value if required and to recall set-ups without overwriting an H Phase adjustment that has changed to cope with different input signal timing.

If the H Phase value is changed to accommodate external timing then storing a set-up after the adjustment will prevent an unexpected reversion to the old value.

**Note:** Output timing is selectable with 0-2-line delay from the assigned reference input. The other inputs must be 0-2 lines earlier than the output. Inputs outside the timing range will be horizontally aligned but vertically offset.

## Memory - save

The SAVE key allows access to the Save Configuration menu for storing and naming of setups within LKEY's non-volatile memory.


*Select named setup*


*Select named setup continued*

| Function | Notes |
|---|---|
| **(1-10) name** | Select preset memory to save current configuration |
| **more** | Select presets 8 to 10 |

### Saving and naming presets

Pressing any of the presets in the SAVE menu enters this menu.


*Set name and confirm*

To save the current configuration in the named memory location or setup, press the Confirm soft button at the bottom right of the display.

To re-name a setup proceed as follows:

Use the Left and Right soft-select buttons to choose a character. Rotate the top right rotary control to change the character

Press the Confirm soft-select button when ready

Setup names may consist of up to ten alphanumeric characters. Cancel returns to the previous menu.

**Note:** Although presets are stored in the LKEY module, preset names are stored in the panel and each panel may use different names for the same presets.

## Memory - recall

The RECALL key allows access to the Recall Memory menu for loading set-ups stored in LKEY's non-volatile memory.


*Select named setup*


*Select named setup continued*

| Function | Notes |
|---|---|
| **(1-10) name** | Select preset memory to recall current configuration. |
| **more** | Select presets 8 to 10 |

To recall a setup simply select the desired setup with the appropriate soft-select button and the settings stored for that preset will be instantly recalled.

**Note:** Although presets are stored in the LKEY module, preset names are stored in the panel and each panel may use different names for the same presets.

## Transfer

The TRANSFER key allows access to the Copy Setup menu for copying configuration from one LKEY to another.


*Select the FROM LKEY*


*Select the TO LKEY*

| Function | Notes |
|---|---|
| **Poll All** | If necessary allow the panel to poll for LKEY modules |
| **From** | Select the source LKEY |
| **To** | Select the target LKEY |
| **Copy Now** | Transfer configuration between LKEY modules |

## Panel lock/unlock

Pressing the F1 key enters this menu.


*Lock or unlock the panel*

To lock the panel to prevent unauthorised use, proceed as follows:

- Enter the password (if not displayed)
- Press Confirm
- Press UNLOCKED to change state to LOCKED

To unlock the panel, proceed as follows:

- Enter the password
- Press Confirm
- Press LOCKED to change state to UNLOCKED

To change the password, proceed as follows:

- Enter the password
- Press Confirm
- Press the Set New soft-select button
- Rotate the top right rotary control to change the character selected by the Left and Right soft-select buttons
- Press the Confirm soft-select button when ready

Passwords may consist of up to ten alphanumeric characters. Cancel returns to the previous menu.

The power-up default is always Unlocked (and the password will be displayed until Confirm is pressed)

**Note:** Lock and Set New are left enabled by the Confirm action until the panel lock menu is exited.

# 7 Trouble shooting

## 7.1 Card edge controls

The front edge of the card provides LED status and power rail monitoring, menu selection, rotary set-up controls and a ten-digit visual status display.


The LKEY211 front view

### Card edge monitoring

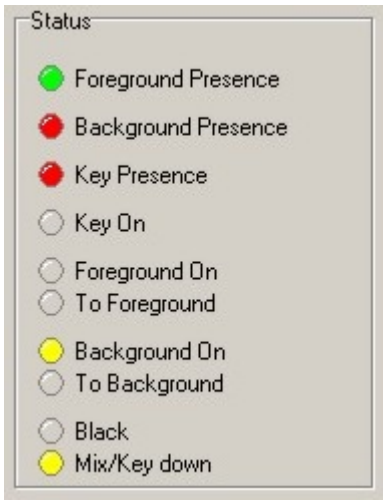
The following table summarises the card edge LED functions and colours:

| LED label | Colour | Status when on |
|---|---|---|
| **FG** | Green | Valid Foreground input detected. |
| **BG** | Green | Valid Background input detected. |
| **Key** | Green | Valid External Key input detected. |
| **WRT** | Amber (bottom) | User memory location being updated |
| **PAL** | Amber (top) | 625-line input detected. |
| **NTSC** | Amber (bottom) | 525 lines input detected. |
| **2.5V** | Green (top) | 2.5V Supply Voltage present |
| **CNF** | Amber (bottom) | Programmable Logic configured |
| **3.3V** | Green (top) | 3.3V Supply Voltage present. |
| **5V** | Green (bottom) | 5V Supply Voltage present. |

**Tip:** The card edge display will show command tally status even when those commands have been received from Statesman or a control panel.

## Statesman status

Statesman provides basic status information within the Presets + ENG menu




*Statesman status display for the LKEY211*

| Function | Colour On/present | Colour Off/absent | State when on/present/active |
|---|---|---|---|
| **Foreground Presence** | Green | Red | Foreground input present |
| **Background Presence** | Green | Red | Background input present |
| **Key Presence** | Green | Red | External Key input present |
| **Key On** | Yellow | Greyed out | External Key in use |
| **Foreground On** | Yellow | Greyed out | Foreground contributing to output |
| **To Foreground** | Yellow | Greyed out | Fader set to 'Fade to Foreground' |
| **Background On** | Yellow | Greyed out | Background contributing to output |
| **To Background** | Yellow | Greyed out | Fader set to 'Fade to Background' |
| **To FG** | Yellow | Greyed out | Fade to source is Foreground |
| **To BG** | Yellow | Greyed out | Fade to source is Background |
| **Black** | Yellow | Greyed out | Output is faded to black – FTB active and faded down |
| **Mix/Key Down** | Yellow | Greyed out | Mix or Key is active and faded down |

# Fault finding guide

**The Power OK LEDs are not illuminated**

Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information

**There is no video output**

Check that valid SDI input are present and that any cabling is intact

**The video output is not synchronous with other sources**

Check that inputs are co-timed within two lines of each other and are synchronous with downstream equipment and that the correct video standard is selected

Check that horizontal delay is set correctly. Output timing is selectable with 0-2-line delay from the assigned reference input. The other inputs must be 0-2 lines earlier than the output. Inputs outside the timing range will be horizontally aligned but vertically offset.

**Card edge settings have changed unexpectedly**

Active control, Safire panel, or GPI settings may have overridden card settings if control panel settings were changed more recently

**Active control panel settings change unexpectedly**

Other control settings may have overridden card settings if they were accessed more recently

**Active control panel does not work as expected**

Check that a unique node address is being used in the frame the module is fitted into

Check that the card edge DIL switch is set for Active Control Panel

Check that jumpers J1 and J2 are set for Active Control Panel (default)

**Safire Controller panel settings change unexpectedly**

Other control settings may have overridden card settings if they were accessed more recently

**Safire Controller panel does not work as expected**

Check that a unique node address is being used in the frame the module is fitted into

Check that the card edge DIL switch is set for Safire Control Panel

Check that jumpers J3 and J4 are set for Safire Control Panel (default)

Check the Safire cabling and remote assignment (section 8.5 and 8.6)

Check PL4 jumper settings

**GPI control does not work as expected**

Check that a unique node address is being used in the frame the module is fitted into

Check that the card edge DIL switch is set for GPI control

Check the GPI cabling

Check PL4 and PL5 jumper settings

**Some Statesman features or controls appear disabled with a purple Background**

Features and controls that are rendered inappropriate or invalid due to the selection of other controls will appear with a faint purple Background.

For example, if Fade Ext Key is selected then the Fade to Black, Mix and Wipe controls will be flagged as ‘Disabled’.

To activate a disabled control click on the ‘disabled’ button to enable it.

**How do I change the Fade To source from Background to Foreground?**

To change the FADE TO source from Background to Foreground, invert both the active and combined keys.

**Re-setting the card**

If required, the card may be reset by simply removing the card from the rack re-inserting.

# 8 Specification

## General

| | |
|---|---|
| Dimensions | 100mm x 266 mm module with DIN 41612 connector |
| Weight | 180g |
| Power consumption | 9.5W |

## Inputs

| | |
|---|---|
| Foreground, Background and Key Video SDI | 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M<br>(Auto 625/525 line selection)) |

## Outputs

| | |
|---|---|
| Main Video SDI | 2 x 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M<br>Will drive >200m Belden 8281 or equivalent |
| Preview Video SDI | 2 x 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M<br>Only 1 output with RM01 rear connector<br>Will drive >200m Belden 8281 or equivalent |
| Background loop through SDI | 1 x 270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M<br>Only available with RM02 and RM18 rear connectors |
| Blanking | All data in the vertical and horizontal blanking interval is passed through unprocessed with full 10-bits. Therefore, the unit will pass through embedded audio and any ancillary data with a delay as set by the horizontal phase adjustment. |

## Timing

| | |
|---|---|
| Timebase range | Maximum input buffer length 2 lines (selectable) |
| Minimum input to output delay | 15µs |
| Reference timing | Selectable from Foreground, Background or key |