eyeheight

LE-2n

Desktop legaliser with composite, RGB and YCC gamut correction

user manual

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1. System Overview

This manual describes the function of the LE-2n which is an LE-2S, LE-2M or LE-2U legaliser processing card connected within a nanobox desktop chassis.

1.1 The nanobox chassis

The nanobox chassis has been designed to provide a low cost way of operating a single legaliser card for stand-alone use without the complex and more expensive infrastructure of an etherbox 1RU rack mount chassis (FB-9E) and 1RU operational panel (FB-9). The LE-2n legaliser card is operated using front panel switches or by a java software application for PC or MAC which will be connected via a supplied USB lead.

Figure 1-1 Figure 1 1 Nanobox chassis with worldwide PSU and USB Cable

1.2 The LE-2n Product

This processing card come in three different styles:

1. The LE-2nS, Standard definition unit, capable of SD operation only.
2. The LE-2nM, Multi definition unit, capable of SD and HD operation.
3. The LE-2nU,Ultra definition unit, capable of SD, HD and Dual Link (4:4:4) operation.

Apart from the operational standards, the units have the same features and are all covered within this manual. Within this manual it can be assumed that

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references to the LE-2n refer to either style of processing card. When there are differences it will be pointed out specifically.

The LE-2n is a full-featured multi-mode legaliser system. The main features of the LE-2n legalisers are as follows:

- Provides Legalisation of the SDI Input signal with full 10 bit processing throughout.
- Composite, YCC (Component) and RGB colour spaces
- Two Independent SDI outputs for "Legalise" and user controllable "Legal/Indicate/Raw".
- Adjustable Clipping Levels.
- Adjustable soft clipping knee levels.
- Highly effective overshoot and undershoot suppression on the luminance signal.
- Integral luma and chroma gain, black level adjustment & hue rotation.
- EBU-R103 standard legalisation settings.
- 7.5 IRE or 0 IRE Pedestal.
- 6 User Memories.
- Unique severity display mode on monitoring output (only available if the unit is used with a FP-9 flexipanel).
- 2 off On-board GPI's for memory recall.
- Compatible with etherbox GPI/Tallies.
- FULLY software and firmware updatable using Flash technology.
- A mechanical relay bypass option is available.

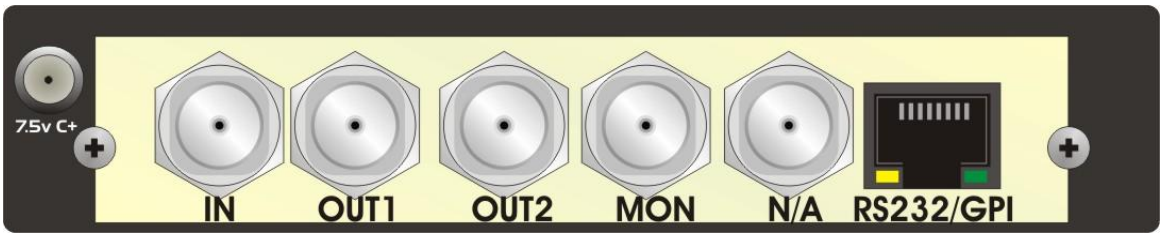

Figure 1-2 LE-2n rear.

The main video connections to the **LE-2** are shown above. Input 2 is for use with a dual-link input only (in conjunction with Input 1). Outputs 1 and 2 are the legaliser outputs and are configurable independently as either Legal, Raw or Indicate outputs, except when running dual-link where both are required for the dual-link output.

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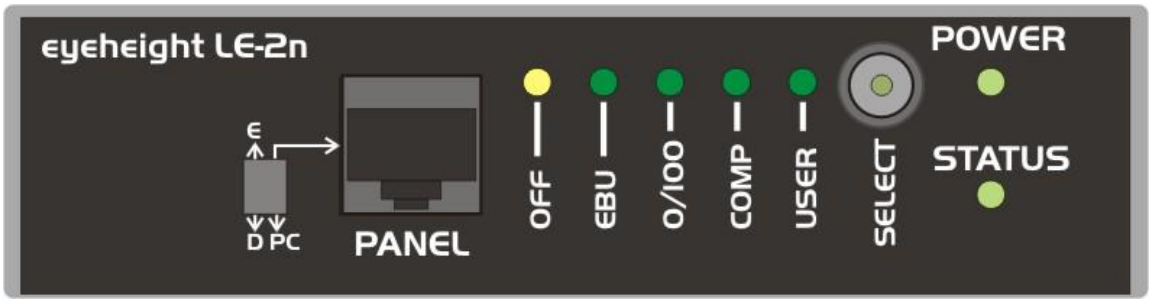

1-3 Front of nanobox.

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2 Setting up the LE-2n

2.1 Associated equipment.

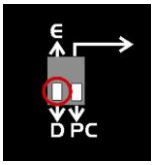
The LE-2n can operate in three modes. These modes are determined by setting the front panel switches. The modes are:

1. Operation using the presets selected by the front panel SELECT switch.
2. Operation using the SoftPanel software on a PC or Mac computer.
3. Operation using an Eyeheight FP-9 Flexipanel.

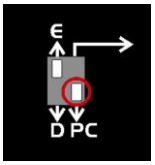
The Dip Switch settings for the above modes are:

1. Set the Left switch to “E” to enable the front panel SELECT switch.

To disable the front panel SELECT switch set the left switch as below (setup and leave).



2. Set the right switch to “PC” as shown below to use the SoftPanel software.



3. Set the right switch to → to use an Eyeheight FP-9 Flexipanel.

Respectively the associated equipment required for operation of the above modes are:

1. No extra equipment is required for operation using the SELECT switch.
2. A PC or Mac to operate the softpanel (user provided) and a USB cable (supplied) and right switch set to “PC”.
3. An FP-9 control panel with an RR-9E rear enclosure (available from Eyeheight) and a standard ethernet cable cable with RJ-45 connectors (user supplied) is also required to connect the FP-9 panel to the LE-2n. Set right switch to →.

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The LE-2n will always be shipped in mode 1 (Front Panel) unless the customer specifies otherwise.

DO NOT CONNECT THE SUPPLIED USB/RJ45 CABLE TO THE FRONT RJ45 LABELLED "PANEL" THIS COULD RESULT IN DAMAGE TO THE UNIT.

ONLY ONE OPERATIONAL MODE CAN BE USED AT A TIME. FOR EXAMPLE THE USER CANNOT OPERATE THE FRONT PANEL SELECT SWITCH (1) AND THE SOFT PANEL MODE (2) AT THE SAME TIME.

2.2 Using the Front Panel Presets.

The front panel SELECT switch allows quick selection of the legalisation presets.

Always input the video before using the SELECT switch to select a preset as changing the video will automatically select the preset that was previously selected for that video standard.

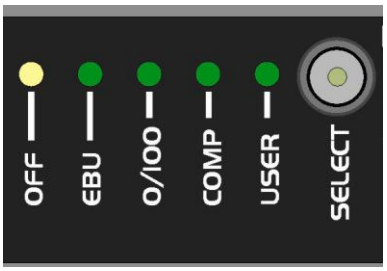

Figure 2-1 Preset Indication LEDs and preset SELECTion switch.

See section 5.1.2 for a full explanation of the presets.

OFF – turns legalisation off and puts the legaliser in bypass.

EBU – selects EBU103 Normal.

0/100 – selects RGB 0-100%.

COMP – selects PAL or NTSC, depending on input video.

USER – recalls User Memory 1 for the input video's standard.

See section 5.1.3 for an explanation of user presets

See section 9 for the LE-2n menu settings

User Memory 1 must have been previously set by:

1. Inputting the required video.
2. Setting the Legalisation Mode.
3. Setting the Clips and Knees etc.
4. Saving the settings to User Memory 1.

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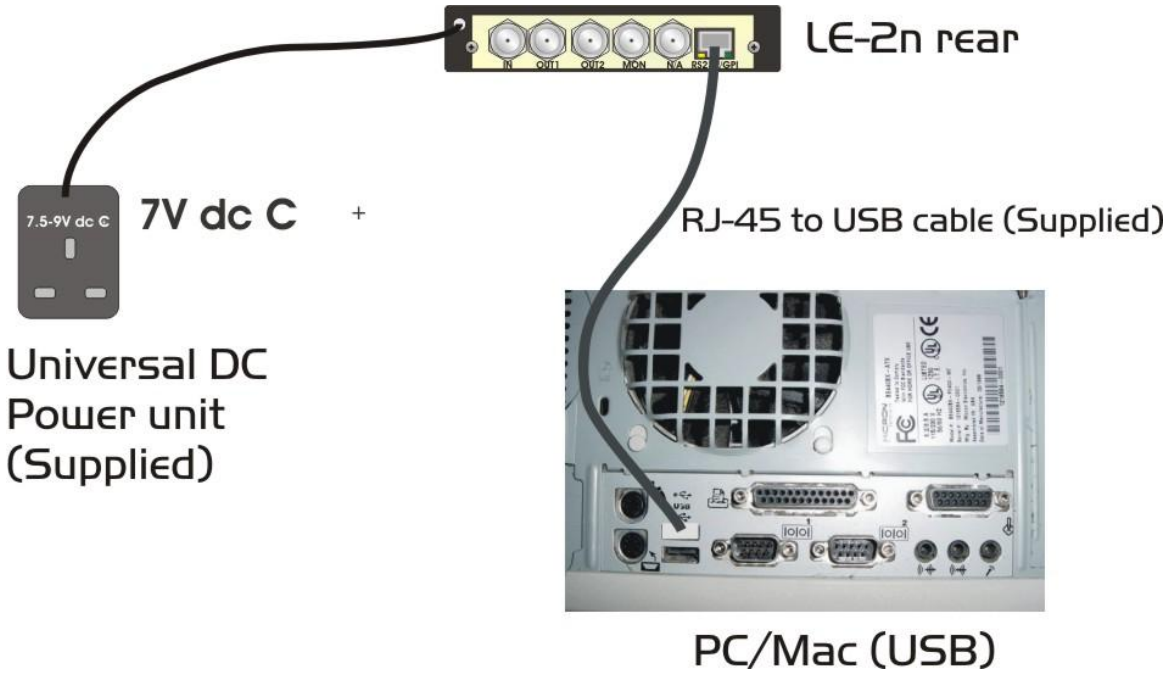
2.3 Connecting the LE-2n using a soft panel.

This is the way the LE-2n is normally shipped. The data and power connections are shown in the diagram below. After power up the Power light should be green and if video is connected the Status light should be green. The Status light will change to orange if no video is connected. In the unlikely event that the status light stays red then the system has found an error and it will need returning to the factory.



2-2 Diagram showing the power and data connections.

THE LE-2n UNIT MUST BE PLACED IN A COOL ENVIROMENT (ROOM TEMPERATURE IS REASONABLE) WITH ADAQUATE VENTELATION. DO NOT COVER OR USE IN AN UNVENTELATED RESTRICTED SPACE.

2.3.1 Installing the software.

The software is provided on an eyeheight USB flash drive which is supplied with the LE-2n.

The softPanel application requires no installation itself. Simply run “softpanel.jar”

However, it requires three platforms to be in place already:

- Java Runtime Environment (Java 5 or later).
- RxTx serial drivers for Java (see below).
- USB to serial drivers.

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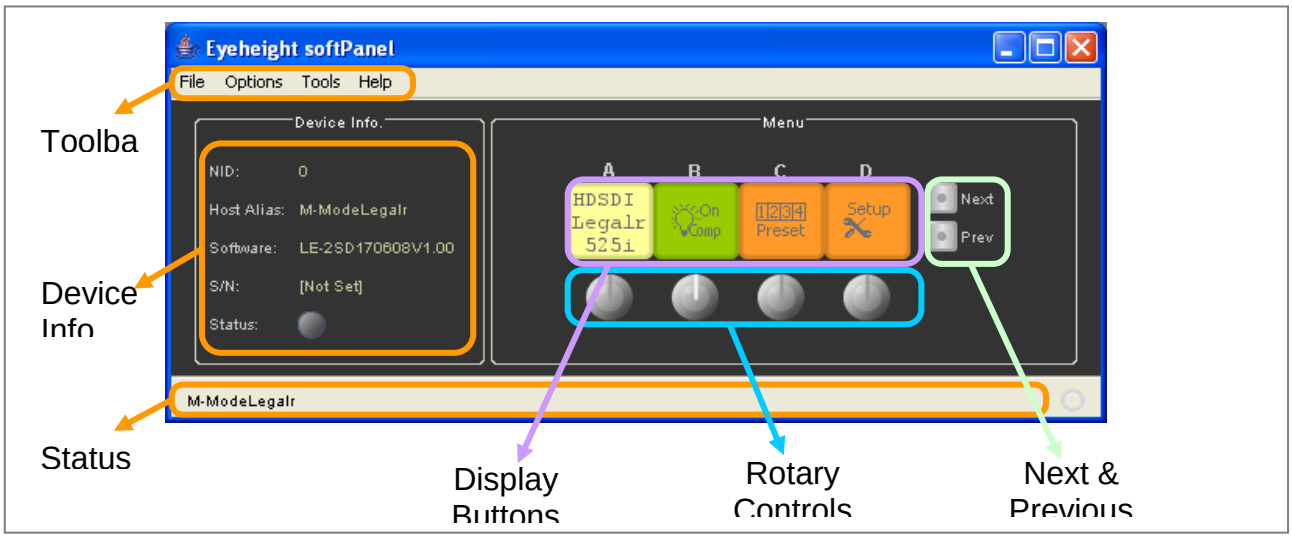
For full installation instructions please refer to the ***softPanel_manual_20xx.pdf*** which is available by selecting:

Support -> **Manuals** -> **Software** on our website at Eyeheight.com and is also supplied on the memory stick which comes with the LE-2n.

2.4 Screen Layout



2.4.1 Toolbar

- File
  - Exit
- Options
  - COM Port
    Tick the name of the COM Port that you want to use.
    The application will enumerate this list of your COM Ports when it starts up.
  - Baud Rate
    This is the speed of the serial comms.
    If you are using the softPanel with a nanoBox (NB-9), you will need to use 115200.
    If you are using the softPanel with an etherBox (FB-9E), you will need to use the same baud rate that the chassis is set to. We recommend using 115200, since that is the fastest available.
  - Large Displays
    If you find the Display Buttons too small, then you can tick this option to increase the size at the expense of the resolution.
  - Multi-Device Mode
    If you are using the softPanel with a nanoBox (NB-9), you will not

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need to set this option.
This option should be set if you are using the softPanel with an etherBox (FB-9E) to control more than one product, as you would a standard panel (FP-9). For more info, see Multi-Device Mode.

- Tools
  - Refresh
    The softPanel will request a menu refresh from the active device. It will also refresh the data displayed in the Device Info box.
  - Send Message
    The messaging system is used to send text messages from the panel to a product.
    For more info, see The Messaging System.
  - Un-acquire product
    Like a standard Eyeheight panel (e.g., FP-9), the softPanel "acquires" control of a product, and retains a lock to prevent other panels from controlling the same device.
    To release that lock, and allow other panels to control the device, use this tool.
  - Search for products…
    Scans the Eyeheight system for available products, and adds them to the Devices list.
    For more info, see Multi-Device Mode.

- Help
  - About…
    Shows version number, release, and development information.

2.4.2 Device Info.

Shows information about the device that you are controlling, to identify it and display status information.

- NID
  The Network ID is an address on the Eyeheight I-Bus communication network.
- Host Alias
  Sometimes known as the username, this is a user definable identification, saved to the product. For more info about setting the Host Alias, see The Messaging System.
- Software
  The version of software that the device is running.
  By convention, this is commonly formed from [product name] + [release date] + [version number].
- S/N
  Serial Number of the device. This uniquely identifies the product.
- Status
  This control will display according to the status of the device.
  The display colour is based on a traffic light system of green, amber, and

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red.
Hover the mouse over the control to see an information tooltip.

2.4.3 Status Bar

Generic GUI component, for conveying information to the user.

In normal use, the status bar will display the Host Alias of the device, but it is also used to display error messages and status updates.

2.4.4 Display Buttons

The four buttons, labelled A, B, C, and D act both as separate menu displays, and as larger combined displays, depending on context.

They also act as buttons; performing an action when clicked. This action will depend on what is displayed on the button at the time.

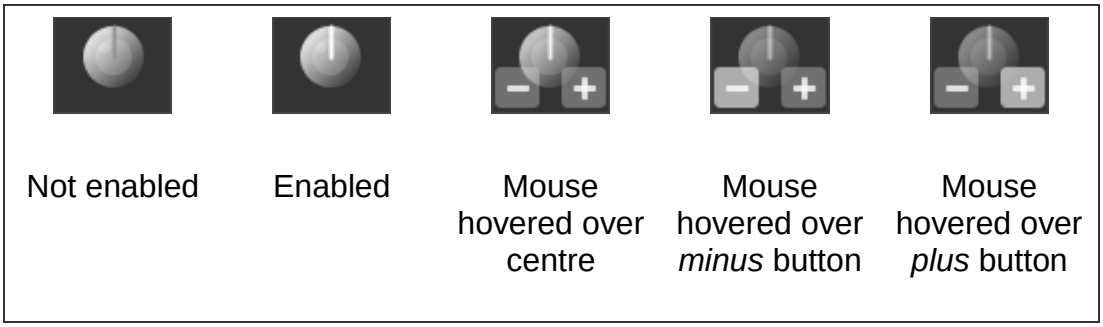
For more info, see Menu Navigation.

2.4.5 Rotary Controls

In normal use, the four rotary controls correspond directly with the four Display Buttons; each to the display above it.

When a rotary control is not enabled, its marker will be grey.

When it is in use, the marker will be white, and it will respond to the mouse pointer, when hovered over it:



Not enabled	Enabled	Mouse hovered over centre	Mouse hovered over *minus* button	Mouse hovered over *plus* button

Click the *plus* button to rotate clockwise (increment).

Click the *minus* button to rotate anti-clockwise (decrement).

The centre button usually restores a menu to its default value.

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2.4.6 Next & Previous Buttons

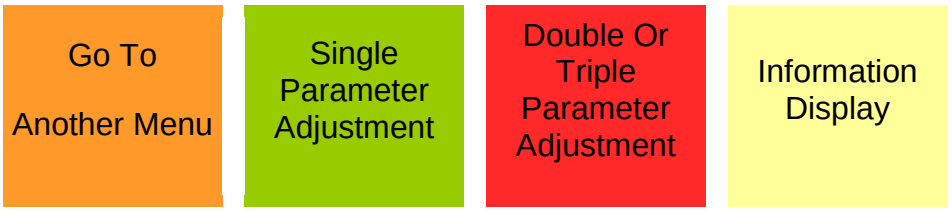
These are aids to navigating the devices “flat” menu systems.

They flash while further menus are available.

2.5 Menu Navigation

Menus are colour coded to show how to interact with them.

See below:



2.5.1 Go To Another Menu

A common menu item, used for navigating tree-structured menus.

2.5.2 Single Parameter Adjustment

A green menu is one in which there is one adjustable parameter.

There are two ways to adjust the parameter in a green menu:

- Press the green Display Button.
  This will increment the value in that window.
  This is most frequently done when the menu parameter is Textural for example switching a parameter between ON and OFF. In this case a button press is most natural.
- Use the Rotary Controls to adjust the parameter in the respective Display Button.
  The direction and speed of rotation enable numeric values to be set easily.

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2.5.3 Double Or Triple Parameter Adjustment

A red menu is one in which there are two or three adjustable parameters. In this case it is necessary to first select the menu by pressing the red Display Button. When the red button is pressed it will turn green, and either two or three of the Rotary Controls will flash, indicating that the respective Rotary Control will operate a corresponding parameter.

2.5.4 Information Display

A yellow menu is one in which only information is displayed.

2.6 Multi-Device Mode

This is available via the Options menu.

It is used to control many devices through one softPanel.

This is not used with the single-product nanoBox system.

In order to use Multi-Device mode, you will need to connect to a chassis containing many devices, such as the etherBox (FB-9E).

Multi-Device Mode will add an additional control to the panel, which lists the available devices. You can populate the list using [Tools > Search for products…], which will scan the connected system for available devices.

2.7 The Messaging System

The messaging system is in place to send ASCII character messages to a product.

Use [Tools > Send Message] to see the message screen as below:

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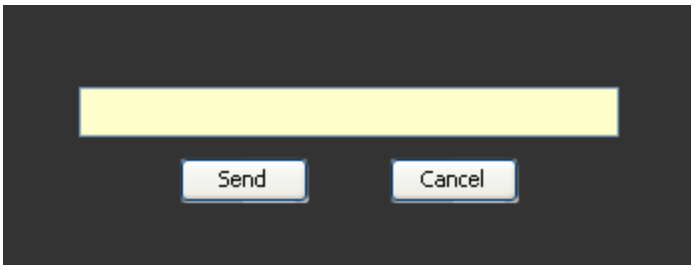

The text box will accept a message up to 32 characters in length.

Click the *Send* button to send the message. The Status Bar will display a confirmation or error message to acknowledge success or failure.

Click the *Cancel* button to return to the normal menu window.

2.7.1 Using the messaging system to set a products username

The username is also referred to as a Host Alias, and is shown on the Device Info panel.

There is a special format of message that sends a new username to a product.

Setting up usernames such as "EDIT 3 dev" or "PRES-A" makes it easy for the user of the panel to know which device is which, particularly when several products in different areas are controlled by one panel.

The following describes how to set up a new user name for a product:

- Ensure that the softPanel has the product which requires its name changing, currently selected.
- Use [Tools > Send Message] to enter the messaging system.
- Type "`U:`" or "`u:`" followed by up to 12 characters which make up the new user name.
  For example "`u:LogoInsert 1`".
- Click the *Send* button.
  If the Status Bar shows "Message Sent", the message has been successfully sent and the user name changed.

2.7.2 Using the messaging system to name a products memories

Nearly all of the Eyeheight products have at least 4 user memories associated with them. Each of these memories can be named individually with a name of up to 12 characters.

The following describes how to set up a new name for a given memory:

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- Ensure that the softPanel has the product which requires its memory named, currently selected.
- Use [Tools > Send Message] to enter the messaging system.
- Type "`Mn:`" or "`mn:`", where n is the memory number, followed by up to 12 characters which make up the new memory name.
  For example, "`m3:--MCR-SET-UP`" will rename memory#3 as "--MCR-SET-UP".
- Click the *Send* button.
  If the Status Bar shows "Message Sent", the message has been successfully sent and the user memory renamed.

2.7.3 Using the messaging system to lock or hide menus from the user

Provision has been provided to "Lock" or "Hide" menus from the user. Locking menus can prevent inadvertent miss-operation of the product in some circumstances. Hiding menus can be used to ease the use of a product where certain menus are not applicable to the user. It is also possible to, for example, hide all the menus except for the user memories (Which can be individually named by the user) and program the memories only for specific functions relevant to the user so effectively making a "Custom" system.

The following describes how to lock or hide menus from the user:

- Ensure that the softPanel has the product which requires its name changing, currently selected.
- Use [Tools > Send Message] to enter the messaging system.
- Type "`Lnn:`" (to lock) or "`Hnn:`" (to hide), where nn is a 2 digit number representing a menu number.
  For example, "`L12:`" will lock menu#12.
- Click the *Send* button.
  If the Status Bar shows "Message Sent", the message has been successfully sent and menu number 12 will be locked from use.
- A small padlock symbol will appear in menu#12.

To "unlock" or "un-hide" a menu using the above general procedure, type "`Ann:`".

To apply a global lock to the entire device, type "`L:`" with no 2 digit number.

A global lock can be undone by typing "`A:`" to access all the menus again.

2.7.4 Engineering Functions Using the Messaging System

The following commands are also available to the user. These are mostly for engineering and system purposes.

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`!?%:` Engineers First Birthday of the device (Factory Reset)

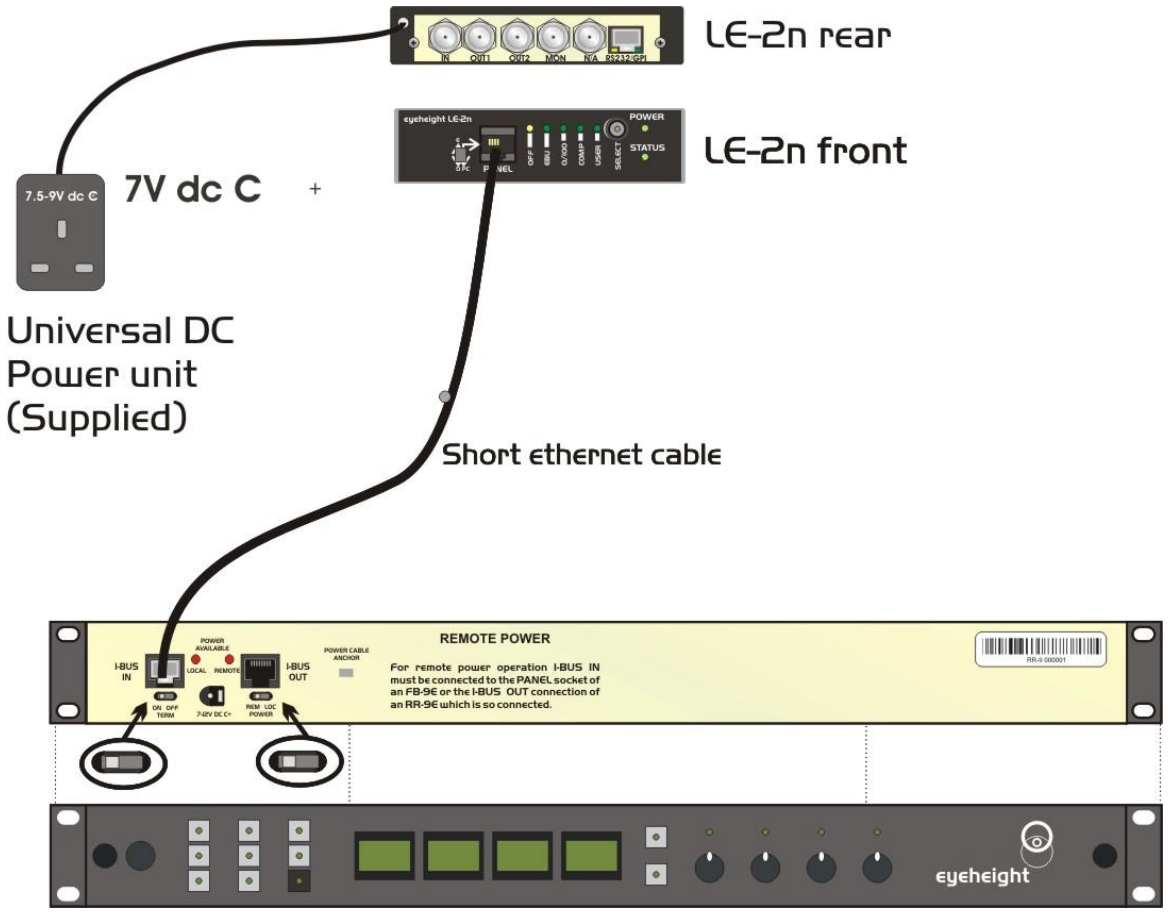
`!mbx` This Informs the device that it is to be installed in an Eyeheight Mini-box

`!nbx` This Informs the device that it is to be installed in an Eyeheight Flexi-Box and will be controlled by a Flexi-Panel in a normal I-BUS network.

The above commands should only be used by qualified engineering staff.

2.8 Connecting the LE-2n using an FP-9.

The LE-2n is normally shipped for operation with a soft panel. If you have *specifically asked* for the system to operate with a flexipanel then it will be shipped this way. The control and power connections are shown in the diagram below. After power up the Power light should be green and if video is connected the Status light should be green. The Status light will change to orange if no video is connected. In the unlikely event that the status light stays red then the system has found an error and it will need returning to the factory.



2-3 LE-2n Power and control connection using an FP-9.

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The Ethernet cable must be <2M long or you may experience fading of the FP-9 display due to voltage drop from the power supply in the LE-2n. If you wish to mount the FP-9 panel very remotely (up to 150 Metres) then set the power switch on the RR-9 (Rear box for the FP-9) to “LOC” (Local) and use the power supply supplied with the RR-9 to power the panel.

2.8.1 Flexipanel controls.

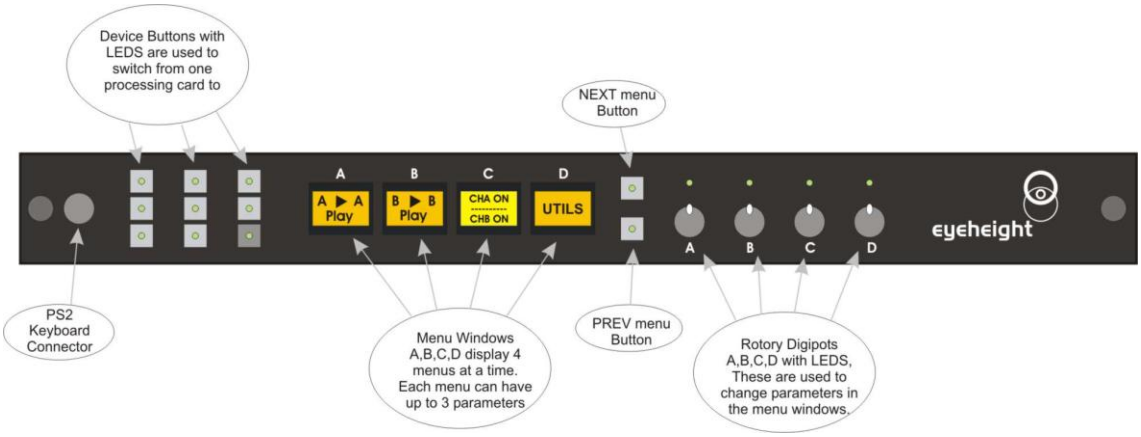

Figure 2-4 Flexipanel (FP-9) controls.

2.8.2 Device Buttons.

There are 8 grey device buttons. These switch between the currently selected processing cards installed in the etherbox. It is also possible to select cards in another chassis if the I-Bus is connected to the other chassis.

2.8.3 Menu Navigation.

There are two ways to navigate from menu to menu.

1. Using the NEXT and PREV buttons. These are for “Flat” menu structures. The NEXT and PREV LEDS will flash while further menus are available.
2. Using a GOTO ANOTHER MENU LCD button (as below coloured orange). This is more common and will take you straight to a relevant set of menus. Examples are the Play and UTILS menu’s shown on Figure 8.

Figure 2-5 Types of menus showing their characteristic colours

2.8.4 Parameter adjustment of a green menu.

A green menu is one in which there is only one adjustable parameter. There are two ways to adjust the parameter in a green menu.

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1. Press the green LCD button. This will increment the value in that window. This is most frequently done when the menu parameter is Textural for example switching a parameter between ON and OFF. In this case a button press is most natural.
2. Use the Rotary digipot (A,B,C or D) to adjust the parameter in the respective LCD window (A,B,C or D). The direction and speed of rotation enable numeric values to be set easily.

2.8.5 Parameter adjustment of a red menu

A red menu is one in which there is two or three adjustable parameters. In this case it is necessary to first select the menu by pressing the red button. When the red button is pressed it will turn green and either two or three of the rotary digipot LEDS will flash indicating that the respective rotary digipot will operate the respective parameter.

2.8.6 Information display

A Yellow menu (Which on most panels does look a light orange!) is one in which only information is displayed. An example of this is the software version display.

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3 Connecting Video to the LE-2n

This unit requires HD-SDI or SDI digital video connections to the BNC connectors. Connections on the LE-2n product

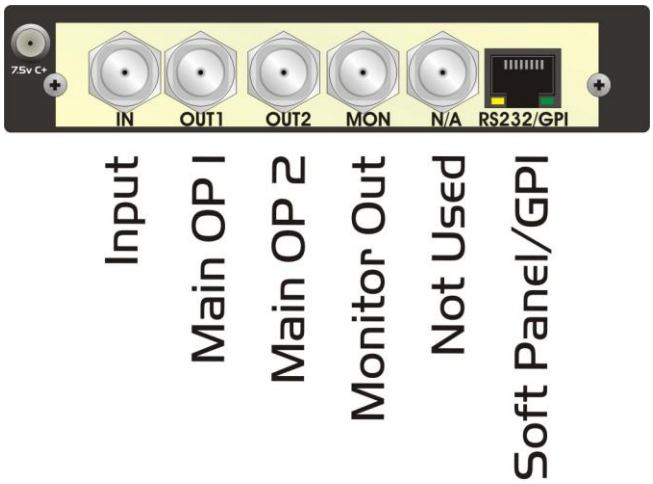

Figure 3-1 LE-2n connections

The main video connections to the **LE-2n** are shown above. Input 2 is for use with a dual-link input only (in conjunction with Input 1). Outputs 1 and 2 are the legaliser outputs and are configurable independently as either Legal, Raw or Indicate outputs, except when running dual-link where both are required for the dual-link output. The RS232/GPI/LTC connection pin-outs are shown in the technical appendix at the end of this manual. If an FP-9 flexipanel is used instead of SoftPanel the RS232 connection can be connected to the COM port of a PC with the eyeheight “Error Logging Application” for QA (Quality assessment) recording purposes. The LTC connection will allow accurate time code stamping for the QA.

If an FP-9 flexipanel is used instead of SoftPanel the RS232 can alternatively be used to recall user memories and presets with a simple text based RS232 protocol.

Three GPI’s can be used to recall user memories 1 and 2 respectively.

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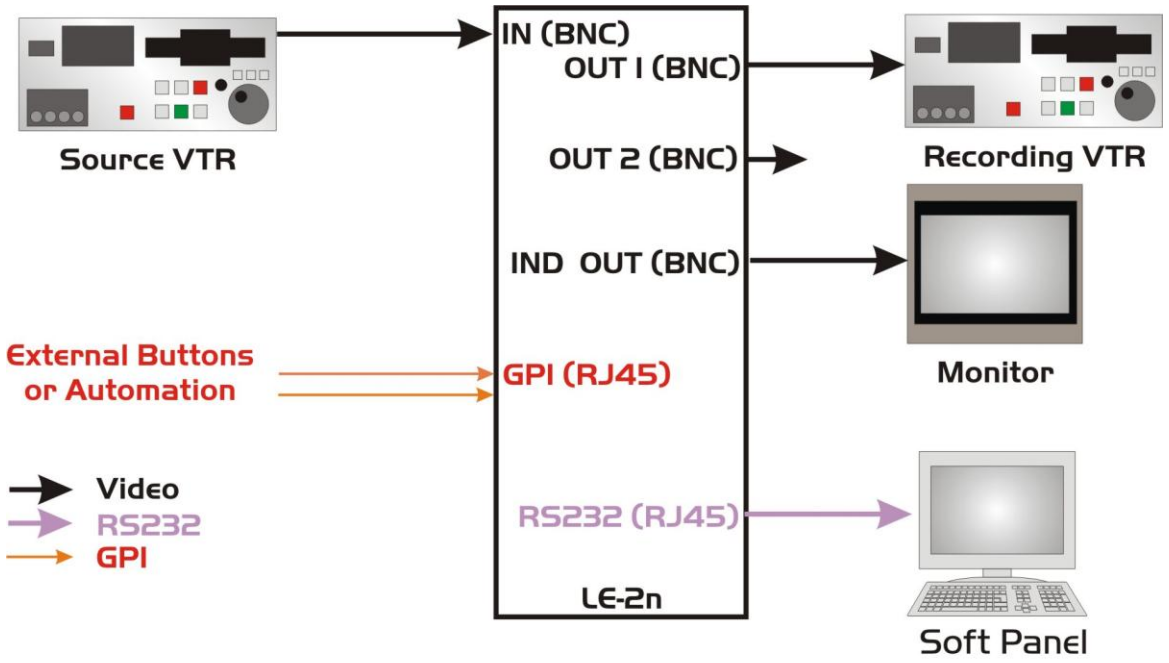

Figure 3-2 - LE-2n Typical connections.

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4 Legaliser Processing

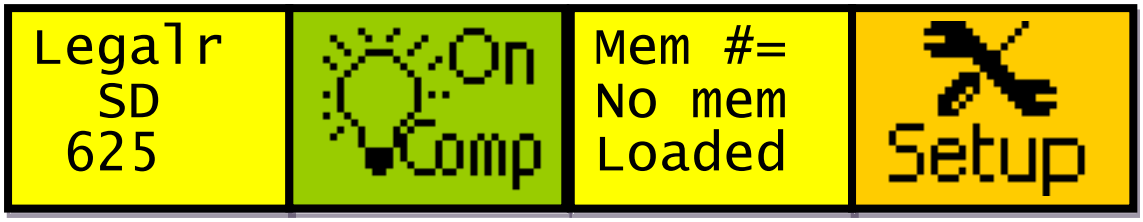
4.1.1 Legaliser

The legaliser operates in one of three modes; RGB, YCC (component) or Composite. The mode is selected via the top level mode menu. Each mode is discussed below. In all modes the legaliser is transparent to pixels within the legal range.

4.1.2 Selecting the legalisation type

This is a view of the top-level display of the LE-2:

Menus 00-03: Top Level Menus



To select the type of legalisation required, press menu B to cycle through the available options. These are:

- Off – no processing of the input video will be performed by the **LE-2**.
- RGB – the picture will be RGB legalised according to the RGB clip and knee settings.
- YCC – the picture will be YCC legalised according to the YCC clip and knee settings.
- Comp – the picture will be Composite legalised according to the Composite clip and knee settings.
- Comp + RGB – the picture will be firstly Composite legalised, and then RGB legalised.

4.1.3 Setting the legaliser domain

It is important to note that in order for the unit to do the correct colour space conversion required, the manner in which the data is converted needs to be specified. This must be done regardless of which type of legalisation is required!

This is selected from the below menu found by navigating to Setup→Comp:

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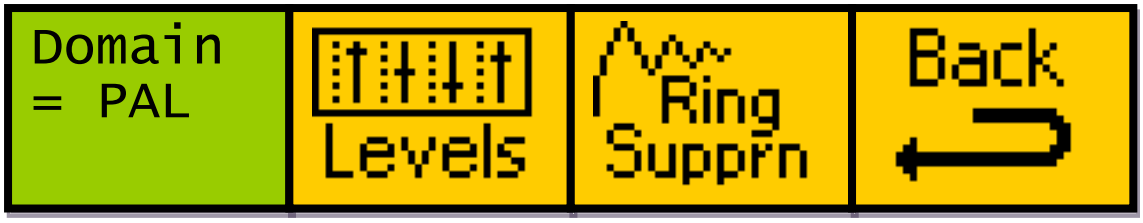
Menus 100-103: Composite main menu



The domain options are listed below:

- Auto – This uses the frame rate to calculate which conversion to use
  - 29.97fps, 30fps, 59.94fps and 60fps means NTSC with pedestal (7.5IRE) will be used
  - 25fps and 50fps means PAL will be used
  - Other detected standards, including 23.98fps and 24fps will use PAL colour space conversion when in auto mode.
- PAL
- NTSC
- NTSC with 7.5 IRE offset (a.k.a. pedestal)

The unit default mode is 'Auto'.

The domain has an effect on a certain number of menus which will display either in mV or in IRE. For a few menus, different values are stored for each mode, so (for example) switching from PAL to NTSC will switch to using the NTSC menus for those few variables, rather than converting the PAL values into NTSC equivalents.

The values treated in this way are listed below:

- High Comp Y clip and knee
- Low Comp Y clip and knee
- High Comp C clip and knee
- Low Comp C clip and knee
- Proc amp gain, black lift value
- Ring suppression high and low clip

4.1.4 Selecting the legaliser values

RGB legalisation

Setting the RGB legaliser values is done via the below menus, which is found under Setup→RGB/YCC→RGB Setup

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Menus 36-39: RGB high clip and knee

The basic form of the RGB legaliser is shown in Figure 4-1. In RGB mode the legaliser first converts the video from the YCbCr colour space to the RGB colour space. The RGB data is then soft clipped according to the settings for RGB High Clip & Knee and RGB Low Clip & Knee. Finally the clipped RGB data is converted back to the YCbCr colour space. The RGB legal colour space is a subset of the composite legal colour space so an RGB legal signal is also composite legal but the reverse is not true.

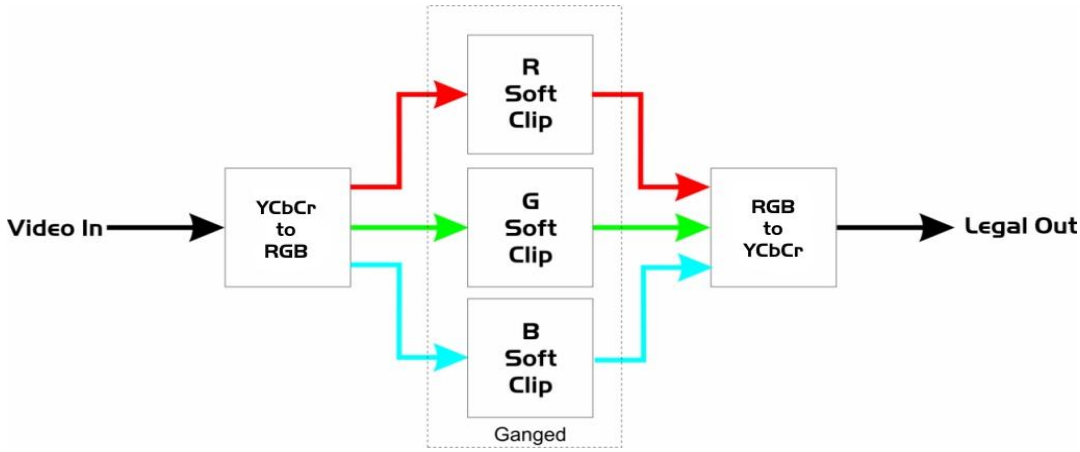
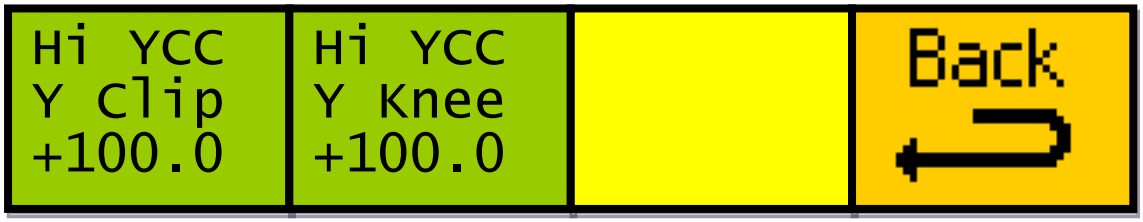


Figure 4-1: RGB Legaliser Structure

YCC Legalisation

Setting the YCC legaliser values is done via the below menus, which are found under Setup→RGB/YCC→YCC Setup

Menus 52-55: YCC high clip and knee



The basic form of the YCC legaliser is shown in Figure 4-2: YCC Legaliser Structure. In YCC mode the legaliser provides direct clipping of the raw YCbCr

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data using separate clip and knee parameters for the Y and colour difference components.

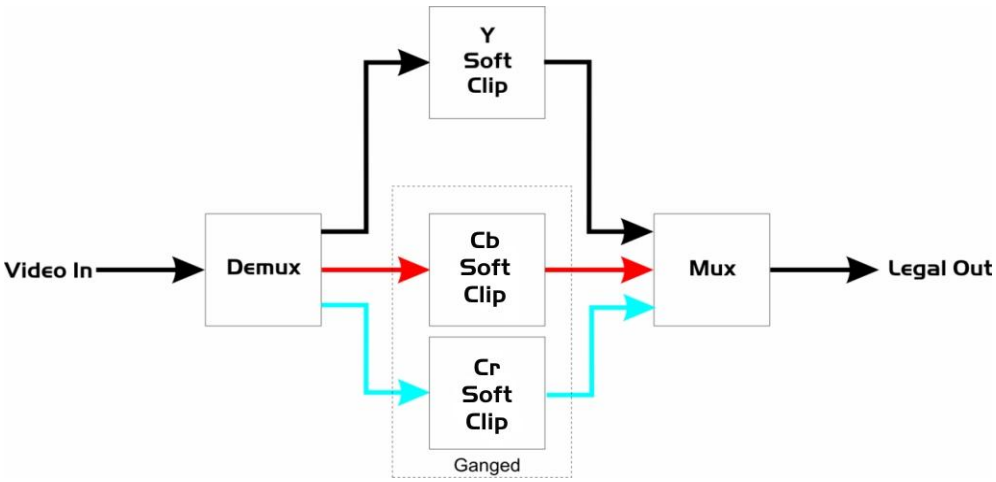
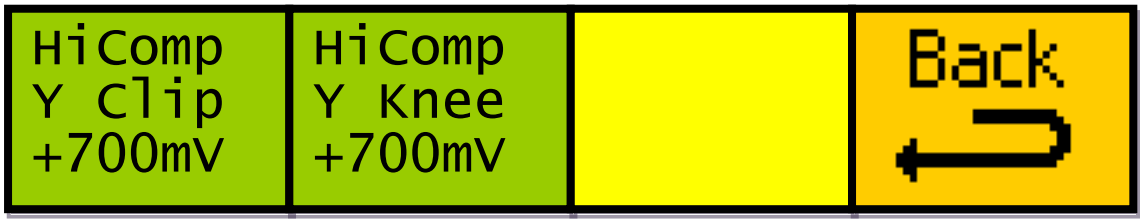


Figure 4-2: YCC Legaliser Structure

Composite legalisation

Setting the YCC legaliser values is done via the below menus, which are found under Setup→RGB/YCC→YCC Setup

Menus 80-83: Composite Y high clip and knee (PAL, mV)



The basic form of the composite legaliser is shown in Figure 4-3: Composite Legaliser Structure**Error! Reference source not found.**. In composite mode the legaliser restricts the Y, Cb & Cr components such that when the signal is converted to a composite waveform the Y component stays within the range allowed by the Y High Clip and Y Low Clip and the total composite waveform stays within the range defined by Comp High Clip and Comp Low Clip.

The legaliser works by selectively reducing the saturation of pixels which would otherwise result in over modulation of the composite waveform. Composite mode preserves the hue of each pixel but not the saturation.

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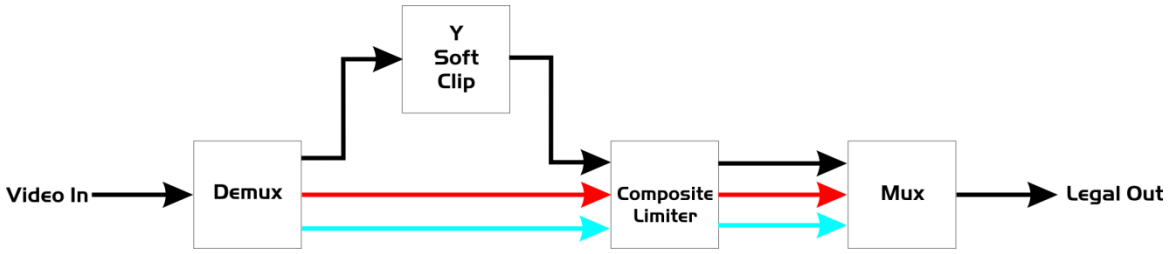

Figure 4-3: Composite Legaliser Structure

Comp + RGB mode

The video signal is legalised as described in the **Composite legalisation** section, and then the legalised signal is passed through a second legaliser as specified in the **RGB legalisation** section.

4.1.5 Clip & Knee

Many of the legaliser functions present Clip and Knee parameters to the user. The Clip parameters specify the maximum and minimum values the system legaliser will allow to pass. Figure 4-4 shows an illegal input to the clipper with detail in the illegal highlight and lowlight areas of the signal. When the knee values are set to the same value as their respective Clips the legaliser operates as a hard-clipper as shown in Figure 4-5 show shows the now legal signal but the detail in the highlights and lowlights has been lost. Figure 4-6 shows the same input signal legalised with a 10% difference between the Clips and their respective Knees. The highlight/lowlight detail has been compressed into the legal region at the expense of some of the dynamic range of the originally legal part of the waveform.

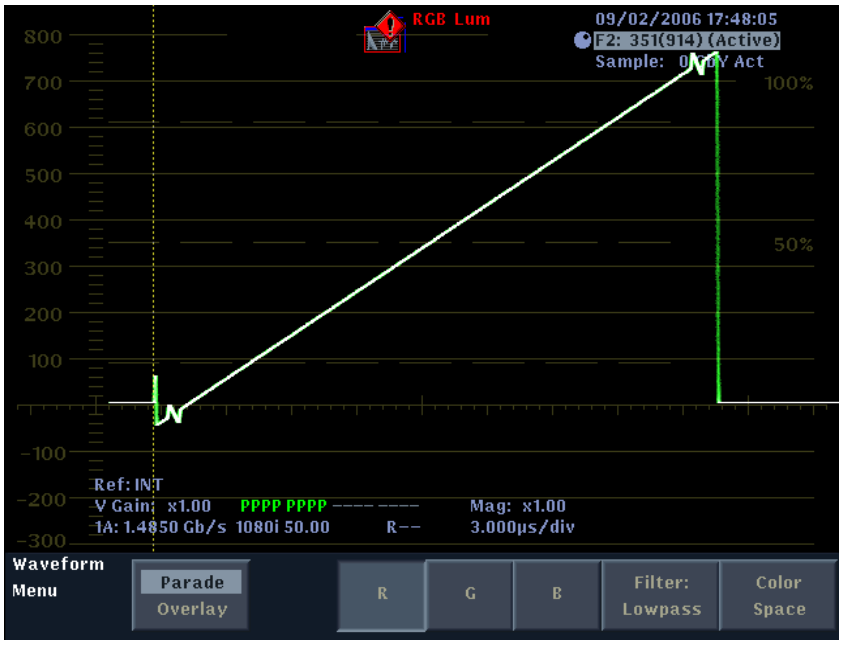

Figure 4-4 - Illegal Source

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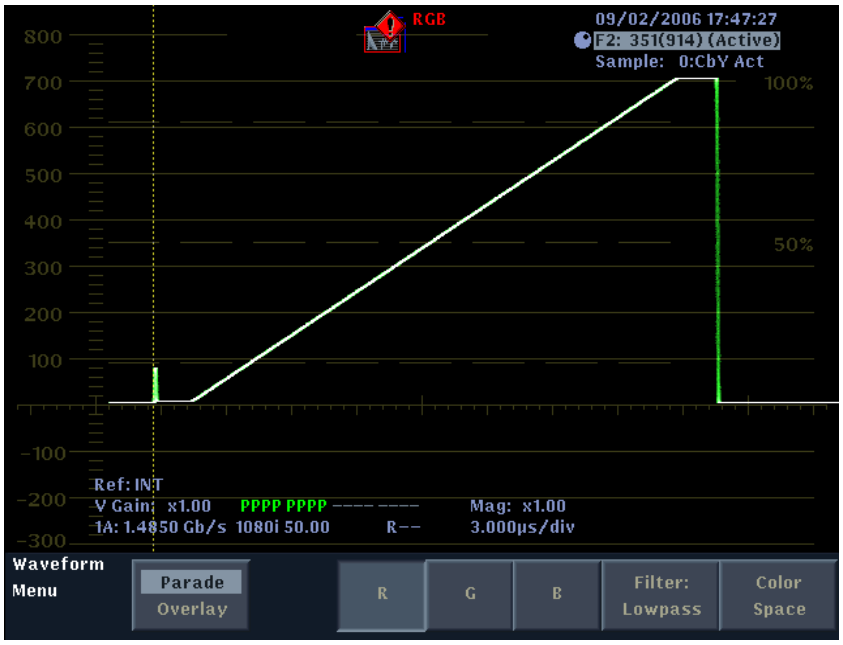

Figure 4-5 - Hard Clipped Output

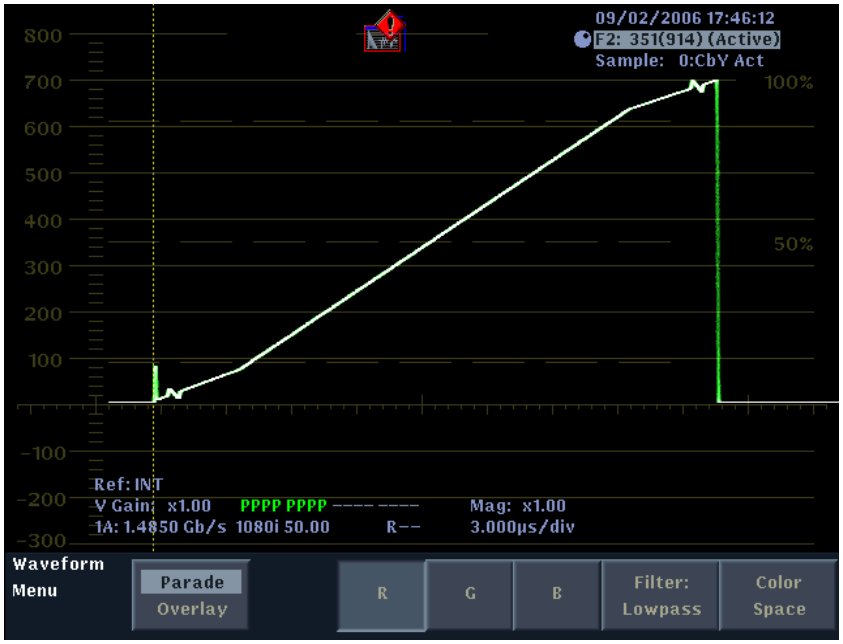

Figure 4-6 - Soft Clipped Output

4.2 Monitoring Output Generation

The second output of the legaliser can be configured either as a second legal output or to display which areas of the picture are being processed by the legaliser. The “MonOp” menu provides control of this feature and allows the user to select which colour is used to represent the processed picture area.

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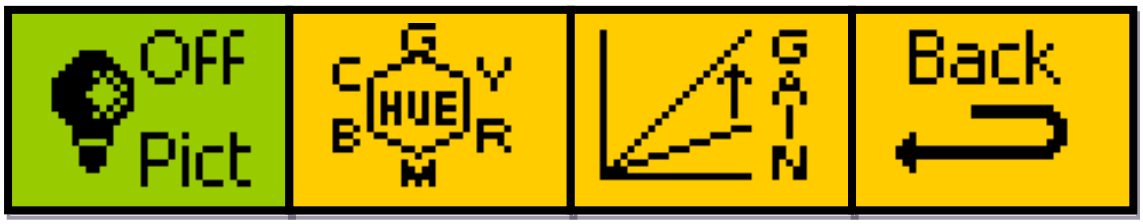
When used as an indicate output the selected colour is keyed over the legal output with the opacity of the colour indicating how illegal the area is. Because signals are typically only slightly illegal the gain on the keyer can be controlled to deliver the desired mix. The gain is controlled by the “Gamut Gain” menu and setting this menu to its maximum value will give the same output as a traditional indicate output.

4.2.1 Proc Amp

Setting the proc amp values is done from the following menu, which is found under Setup→Lift/Gain:

Menus 16-19: Proc amp main menu



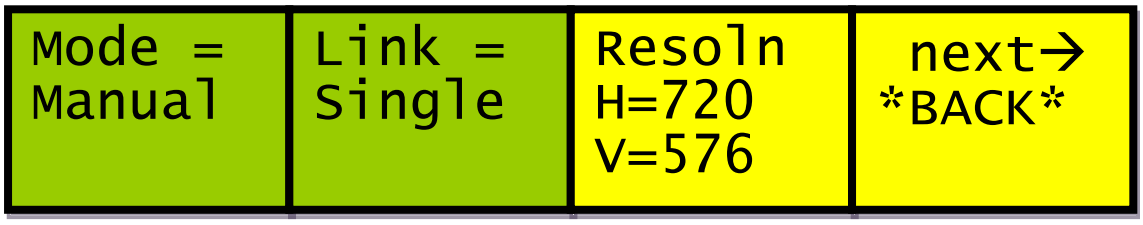
The proc amp enables the luma gain to be adjusted from 0 to 200%, Similarly the chroma also is adjustable from 0 to 200%. Full 10 bit by 10 bit multipliers are used with a rounded 10 bit product. Black level adjustment is also applied at this point as is hue adjustment which allows for ±180° of hue rotation.

4.2.2 Setting up the input video parameters (UltraDef units only)

For the unit to function correctly, it may be necessary to change some of the default input video parameters, especially if the unit is to be used in dual-link mode.

Changing the input video settings is done via the following menus, found under Setup→In/Out→i/p Config:

Menus 108-111: Input details menu 1/2



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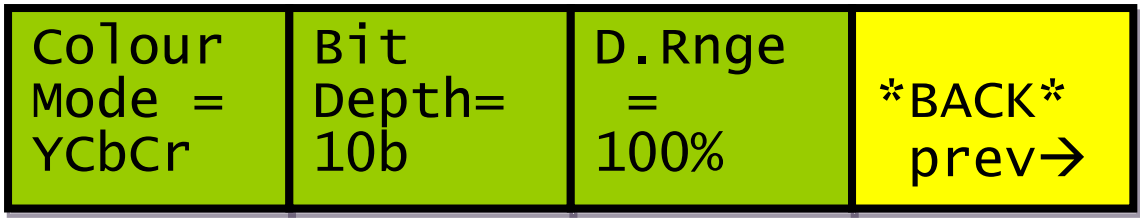
Menus 112-115: Input details menu 2/2



Mode

This can be set to either manual or SMPTE 352

SMPTE 352 mode allows the LE-2s input video settings to be automatically detected via embedded SMPTE 352 information preset in the input video stream, if such data exists. If this is set to SMPTE 352, the following menus will not be changeable by the user.

Manual mode requires the following to be set up manually for correct operation of the LE-2.

Link

This is either single or dual-link.

If using SMPTE 352 in dual-link mode, this will also indicate if only one of the two inputs is present, or if the input video streams have been connected to the LE-2 the wrong way around.

Resoln (indicates on all versions)

This indicates the resolution of the input video as detected by the LE-2

Colour mode

This selects the input video colour mode as either YCbCr or RGB.

Bit depth

This sets the input video bit depth to either 10 or 12 bit.

D.Rnge

This sets the dynamic range of the input video to 100, 200 or 400%.

4.2.3 Setting up the output video parameters

Either output of the LE-2 can be configured as an indicate output, which allows the user to see which parts of the picture are being processed by the legaliser. The output config menu allows you to set the type of signal present at the output BNC's, and the output monitor menu allows the indicate output settings to be customised, including solid / flashing / Zebra indication modes, colour choice and intensity level.

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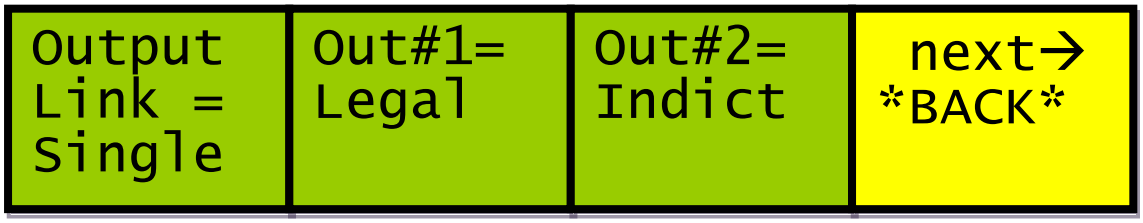
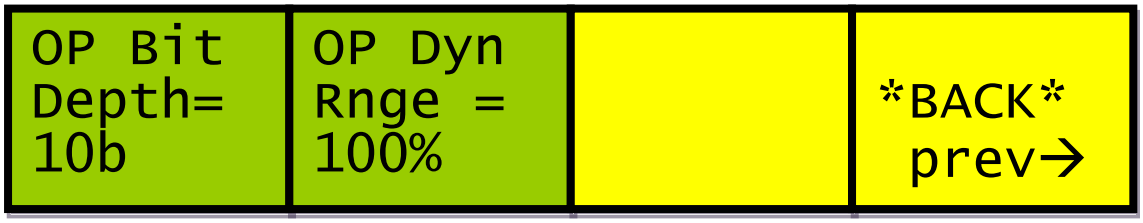
To set up the output video settings, navigate to Setup→In/Out→Output→Config:

Menus 224-227: Configure outputs menu 1/2



Menus 228-231: Configure outputs menu 2/2



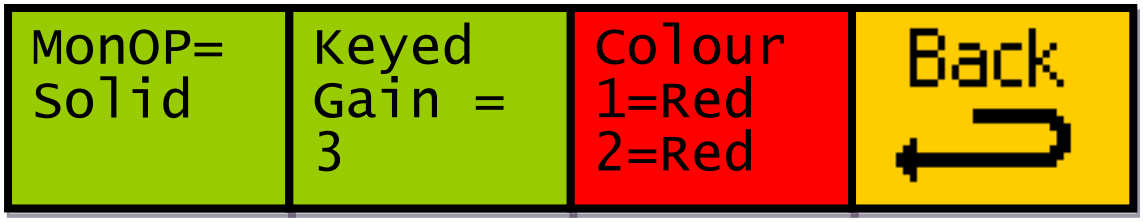
If using the LE-2 in dual-link mode (UltraDef units only), outputs 1 and 2 cannot be set independently, so any changes to the outputs will be automatically made to both.

The output modes can be set to the following:

- Legal – output is the legalised video stream
- Raw – output is the raw unaltered input video stream
- Indicate – output is the legalised video stream, but with the illegal parts of the video stream coloured according to how the output monitor menu is set up.

The output monitor menu is shown below, accessed by going to Setup→In/Out→Output→Monitor:

Menus 220-223: Monitor output menu



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When using an indicate output, the selected colour is keyed over the legal output with the opacity of the colour indicating how illegal the area is. Because signals are typically only slightly illegal the gain on the keyer can be controlled to deliver the desired mix. The gain is controlled by the “Keyed Gain” menu and setting this menu to its maximum value will give the same output as a traditional indicate output.

4.2.4 Recalling settings when video standard is changed

When the menu settings are changed the new values are automatically backed up to non-volatile memory. When the video standard is changed the previous settings for that standard are automatically restored.

4.3 Advanced features of the LE-2

4.3.1 Ring suppression

Ring suppression is controlled from the following menu, found by navigating to Setup→Comp→Ring Supprn:

Menus 208-211: Ring suppression (RGB, percentage)

There are 3 different instances of this menu; one for RGB (in percent, as shown above), one for PAL (in mV) and one for NTSC (in IRE). The displayed menu will depend on the legalisation required, and the domain selected. Changes to the values within these menus are not copied across all three instances, so settings for PAL, NTSC and RGB are all stored separately.

Ring suppression can either be off, on or auto. In auto mode, the high and low settings for the current legalisation type are used as the high and low clip values for the ring suppression.

4.3.2 Adjusting the input picture blanking

Adjustment of the input picture blanking parameters uses the menu below, found under “Utils → Blank”

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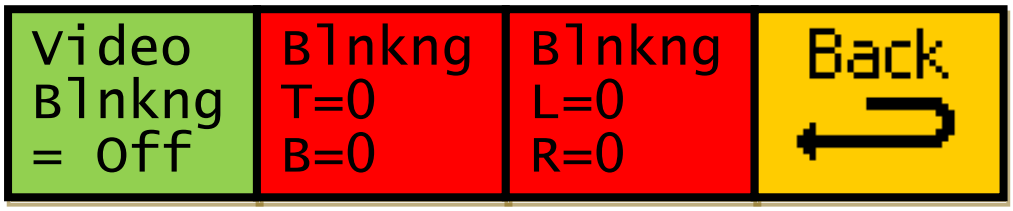

The blanking is defined as the number of pixels in from the edge of the input video picture that you want to be blanked off.

- T is the number of pixels of blanking from the top of the picture
- B is the number of pixels from the bottom of the picture
- L is the number of pixels from the left edge of the picture
- R is the number of pixels from the right edge of the picture
- By default, all blanking variables are set to zero
- Video Blanking defaults to “Off”.

4.3.3 PC Logging Application (Only available if an FP-9 flexipanel is used instead of SoftPanel)

Installation

The latest version of the logging application can be downloaded from http://www.eyeheight.com/software/Utilities/Composite_legaliser_TimeCode_utility.zip

The software requires the .NET Framework v1.1 to be installed on the PC to be used for logging. The .NET Framework can be downloaded free of charge from http://www.microsoft.com .

Extract all files in the LESDC_logger.zip file to a directory of your choice. Run the logger.exe file to start the logger.

Setting Up for Logging

For successful logging the unit needs to be set to generate the logging output by setting the “Log Mode” menu to on. The unit then needs to be connected to a spare COM port on the PC (make a note of the com port number as it will be required when configuring the logging software) using a standard serial cable. Finally the com port needs to be configured in the logging software via the Comms menu.

Understanding the Application

The application provides a graphical log of the percentage of pixels in the incoming video which are considered to be illegal and the GUI can be seen in **Figure 4-7**. The application also provides a visual indication of illegal (green) and severely illegal (red) pixels where a pixel is considered to be severely illegal if it is more illegal than the gamut threshold. This enables the operator to isolate the dangerously illegal cases from those caused by minor variations between legaliser designs.

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To start logging set up the COM port in the comms menu and then click start. The logging operation can be suspended by hitting the stop button. Where timecode is available to the unit in the format specified within the timecode menu of the **LE-2**, the application will log data against the timecode. If the timecode stops the log will also stop. If no timecode is present the application will log continually.

The received section gives details of the last log entry received whilst clicking on the graph window brings up the cursor and populates the cursor section with the log entry relating the selected bar. The zoom control allows viewing of a larger area of the log data.

Logs can be saved and opened at a later date using the file menu.

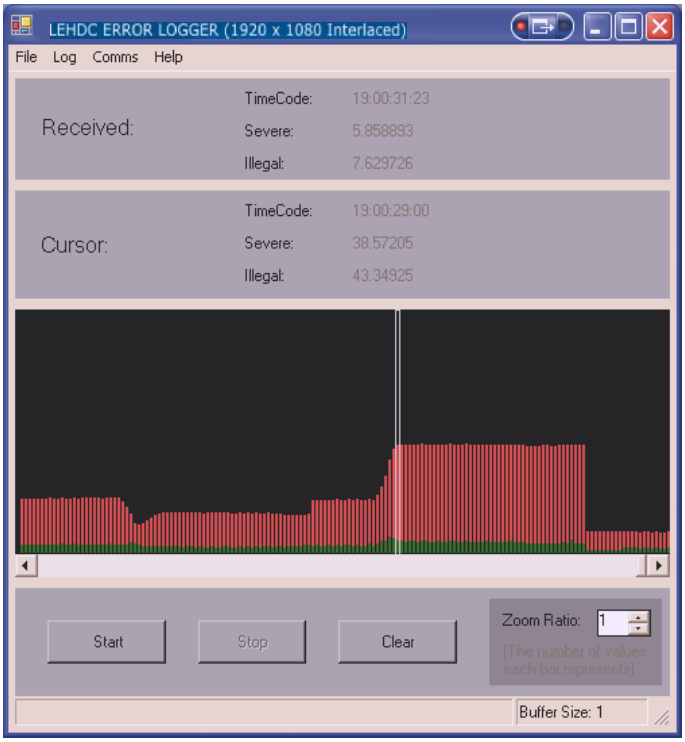

Figure 4-7: Logging Application GUI

4.3.4 Setting up timecode extraction

If timecode data is present in the input video, it can be extracted for use with the logging software to give a precise view of exactly where illegal video is.

Setup of the timecode extraction is done from the below menu, found under Setup→Utils→T.Codes:

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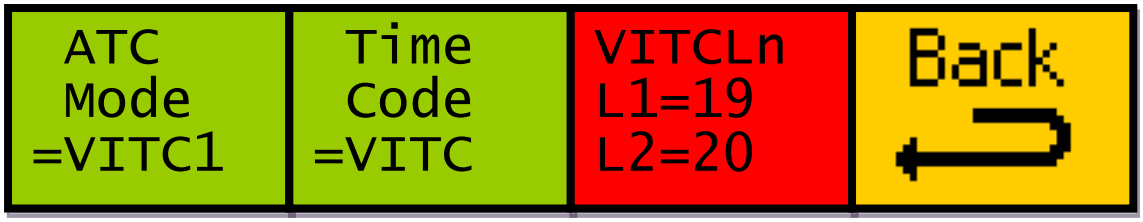
Menus 128-131: Time code menu



To set up timecode extraction, select the timecode type from VITC, LTC or ATC and if necessary, select the ATC mode or VITC line numbers to further specify where the timecode data should be extracted from.

When this data is specified correctly, the next time the logging application is used it will log the legaliser data with timecode data.

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5 Other Features

5.1 Memories

5.1.1 Power on memory

On power up, this product will follow the power on memory settings set as on menu 144.

5.1.2 Preset memories

There are 6 preset memories, which set the unit up with some common settings. These are outlined below:

PAL normal:

- Legalisation method to ‘Comp’
- Ring suppression off
- Comp Y high clip and knee to 700mV
- Comp Y low clip and knee to 0mV
- Comp C high clip and knee to 930mV
- Comp C low clip and knee to -230mV
- Comp domain to PAL

NTSC normal:

- Legalisation method to ‘Comp’
- Ring suppression off
- Comp Y high clip and knee to 100.0 IRE
- Comp Y low clip and knee to 0.0 IRE
- Comp C high clip and knee to 120.0 IRE
- Comp C low clip and knee to -33.0 IRE
- Comp domain to NTSC 7.5 IRE

Bypass All:

- Legalisation method to ‘off’
- Ring suppression off

0-100% RGB:

- Legalisation method to ‘RGB’
- RGB high clip and knee to 100.0%
- RGB low clip and knee to 0.0%
- Ring suppression off

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EBU103 Tight:

- Legalisation method to ‘RGB’
- RGB high clip and knee to 103.0%
- RGB low clip and knee to -1.0%
- Ring suppression off

EBU103 Normal:

- Legalisation method to ‘RGB’
- RGB high clip and knee to 101.0%
- RGB low clip and knee to 0.0%
- Ring suppression off

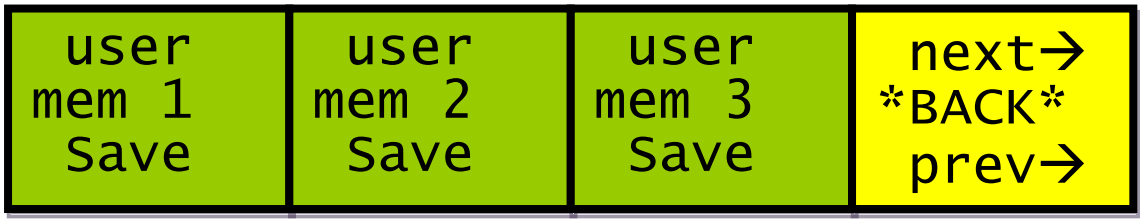
Please note that no settings other than those listed above are changed when loading these presets.

5.1.3 User Memories

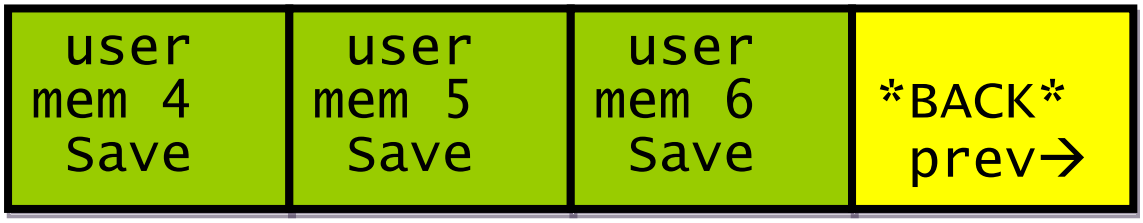
The user memories are a generic feature of all eyeheight geNETics products. The LE-2 has six presets for common legalisation standards and six user memories, which are initially named, ‘user Mem 1’ through to ‘user mem 6’.

To save to a user memory, set up the unit as required and navigate to Setup→ System→Mems→USER Preset, then save the settings from either of the menus shown below:

Menus 168-171: User memories menu 3/4



Menus 172-175: User memories menu 4/4



To show this memory as the loaded memory you will need to immediately load it once it’s saved, using the appropriate ‘user mem recall’ button.

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5.1.4 Naming User Memories

The user memories can be named with up to 6 characters. To name memory 1, “MyLeg1”

1. Use the appropriate messaging system to send “M01: MyLeg1” (do not include the quotes)
2. You may get a “not acknowledged” message, this does not matter.

Other memories can be named in the same way but changing the 01 to another memory number.

5.2 Tamper Locking the LE-2.

The user can lock specific menus or all the menus on the LE-2 so that it cannot be adjusted with a manual control panel. This does not effect automation.

To lock only menu 44. (RGB Hi Clip):

1. Use the appropriate messaging system to send “L05:” (do not include the quotes)

A padlock symbol will appear on the menu and it cannot be adjusted. To unlock menu 44, type “A44:”. Other menus are done in the same way

To lock the whole product type “L:” and to unlock the whole product type “A:” .

5.2.1 Globally locking the user menus (only available if an FP-9 is used instead of SoftPanel)

Hold in the DEVICE SELECT button to which the LE-2 is assigned until a message is displayed on the menus informing you that “User has LOCKED menus” or “User has UNLOCKED menus”.

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6 GPI/Tally Set-up.

6.1.1 On-Board GPI's

The LE-2 is a geNETics product. The geNETics system uses generic Input/Output cards which have 2 GPI's. These GPI's activate the first 2 user memories in the system. The user memories do have different initial names depending on the operational mode. (Memories are stored separately for 625, 525, 1080 and 720 line standards)

GPI 1 - Activate User Memory 1 (625), 7 (525), 13 (1080), 19 (720)

GPI 2 - Activate User Memory 2 (625), 8 (525), 14 (1080), 20 (720)

Activate = Short to ground or logic 0V. See Appendix.

6.1.2 Configuring tallies on the etherbox.

The LE-2 can use an etherbox tally to indicate that it is is bypass (no processing) mode

The etherbox chassis has three usable tallies. These are Tallies 11,12 and 13. Set up menu 121 for the box number and tally number that you wish to use. If you do not wish to use a tally set the box number to 0. Refer to the etherbox manual for interface information.

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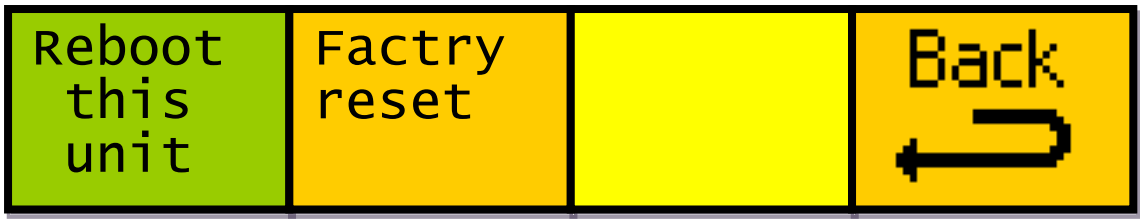
7 Resetting the LE-2

There are 2 types of resets available which don't involve removing the LE-2 from the chassis. Both of these are available from the following menu, navigated to via Setup→System→Resets:

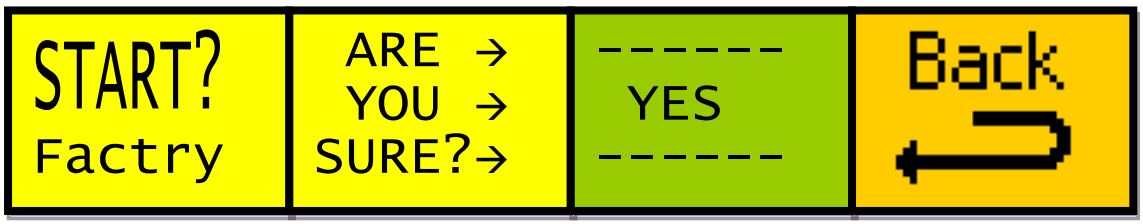
Menus 188-191: Resets menu



The 'reboot this unit' option will have the same effect as removing power to the LE-2, without having to have physical access to the unit. If the unit exhibits unusual behaviour, this is a good action to take and may correct the problem. It is likely, however, that output video will be slightly interrupted as the unit resets, so doing this while on-air is not recommended.

The 'factory reset' option will display the following menu:

Menus 196-199: Factory reset menu



Pressing "YES" will restore all the factory default settings and will clear all the memories.

WARNING! Performing a factory reset will permanently erase all user memories that have been stored, as well as erasing the current power-on default setting.

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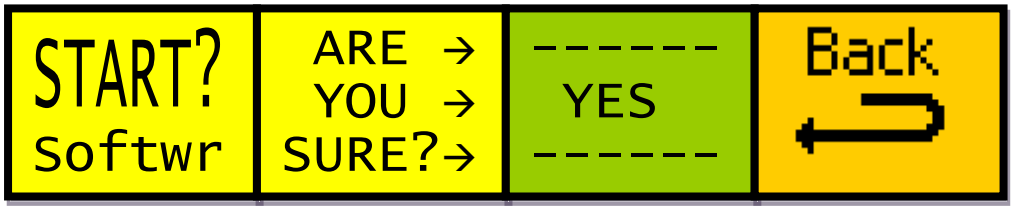
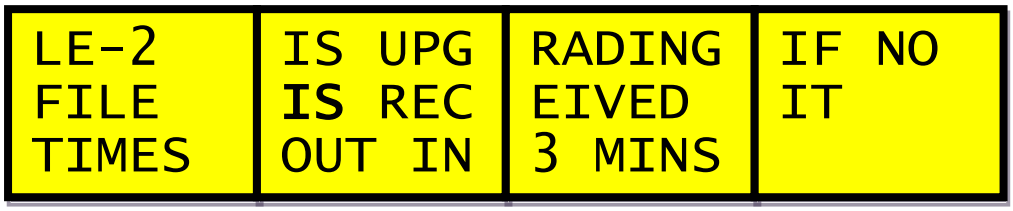
8 Software upgrade

Using either SoftPanel or the FP-9 flexipanel navigate to the following menu, under “Setup→System→Ver’ns”

Pressing “UPGRDE SOFTWR NOW!!!” will display the following set of menus



Pressing “YES” will display the following set of menus



The unit will be set into the state where it can be field upgraded using the “Flasher” software which can be downloaded from our web site: www.eyeheight.com

If using SoftPanel, now shutdown SoftPanel and open the “Flasher” software.

Follow the instruction given in the “Flasher” instruction manual.

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9 The LE-2n Menu Set.

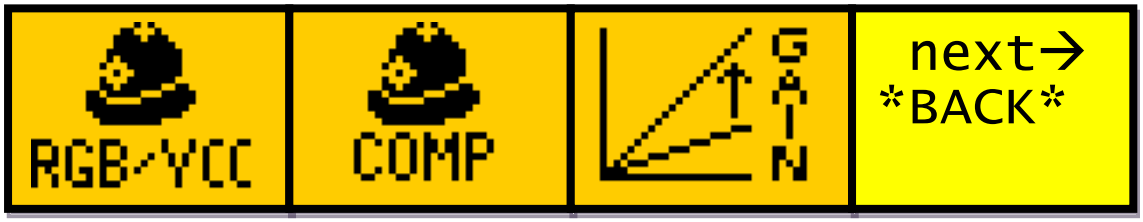
The following set of menus defines the operational controls of the LE-2n.

Note: Only parameters with RED menu numbers are stored in the memories and the Power-ON memory.

Menus 00-03: Top Level Menus

Menu Num.	Heading	Function
0	Legaliser standard	This menu displays the current input video standard, as detected by the LE-2.
1	Legaliser mode	This menu selects the required legalisation mode between off, RGB, YCC, comp or comp & RGB.
2	Memories menu	Pressing the button takes you to the memories menu (Go To **Menus 148-151**)
3	Setup	Pressing this will take you to the first of the nested setup menus (Go To **Menus 04-07**)

Menus 04-07: Main menu set 1/2



Menu Num.	Heading	Function
4	RGB/YCC legal menu	Pressing this button takes you to the RGB and YCC legalisation settings menus (Go To **Menus 28-31**)
5	Composite legal menu	Pressing this button takes you to the Composite legalisation settings menu, which includes the ring suppression (Go To **Menus 100-103**)

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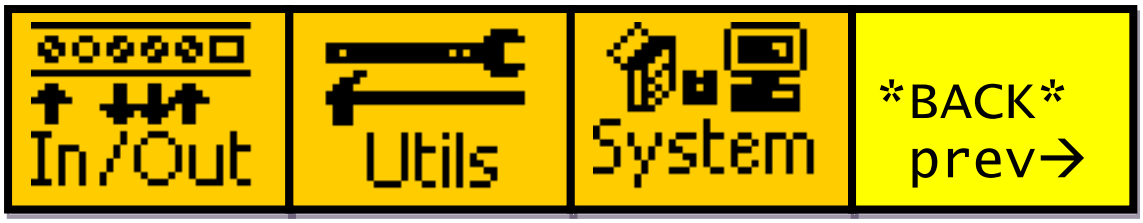
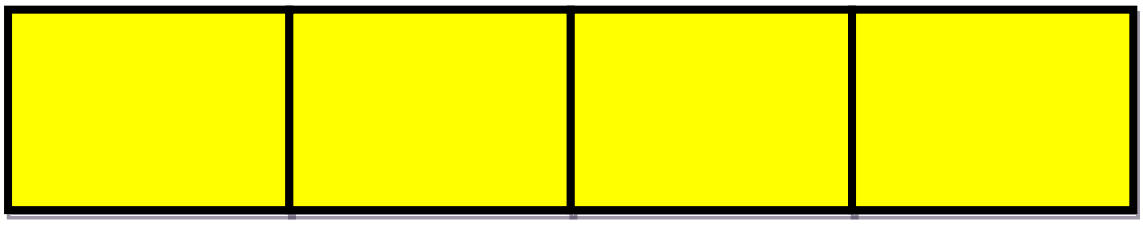
6	Proc amp menu	Pressing this button takes you to the Proc amp settings menu (Go To **Menus 16-19**)
7	Back	Pressing this button takes you to the previous level of menus (Go To **Menus 00-03**) Pressing the **next** button on the panel will take you to the next menu in the nested menu sequence (Go To **Menus 08-11**)

Menus 08-11: Main menu set 2/2



Menu Num.	Heading	Function
8	Input & output video settings	Pressing this button takes you to the input and output settings menu (Go To **Menus 104-107**)
9	Utilities menu	Pressing this button takes you to the utilities menu (Go To **Menus 120-123**)
10	System menu	Pressing this button takes you to the system menu (Go To **Menus 180-183**)
11	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 00-03**) Pressing the **prev** button on the panel will take you to the previous menu in the nested menu sequence (Go To **Menus 04-07**)

Menus 12-15: Blank



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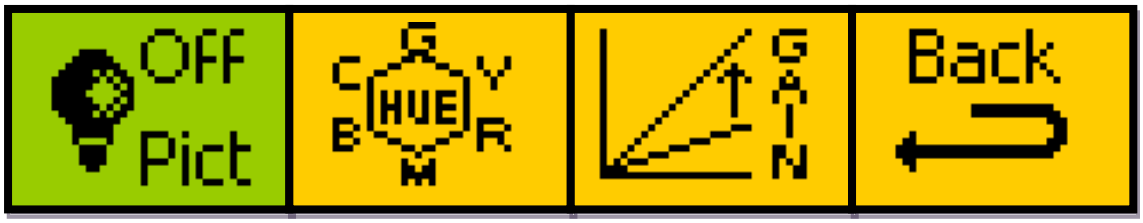
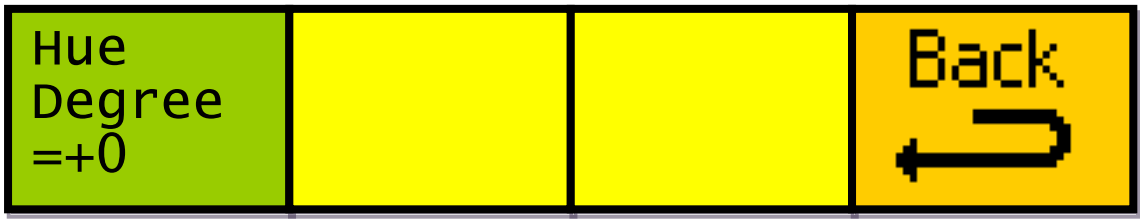
Menu Num.	Heading	Function
12	---	---
13	---	---
14	---	---
15	---	---

Menus 16-19: Proc amp main menu



Menu Num.	Heading	Function
16	Proc amp status	Pressing this button turns on or off the proc amp.
17	Hue menu	Pressing this button takes you to the hue menus (Go To **Menus 20–23**)
18	Gain menu	Pressing this button takes you to the gain menus (Go To **Menus 24-27**)
19	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 04-07**)

Menus 20–23: Proc amp hue



Menu Num.	Heading	Function
20	Hue adjustment	This button sets the value of the hue adjustment, with a range of -180 to +180 degrees.
21	---	---
22	---	---
23	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 16-19**)

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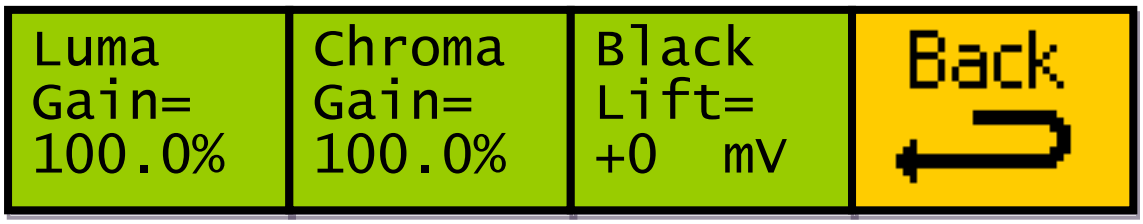
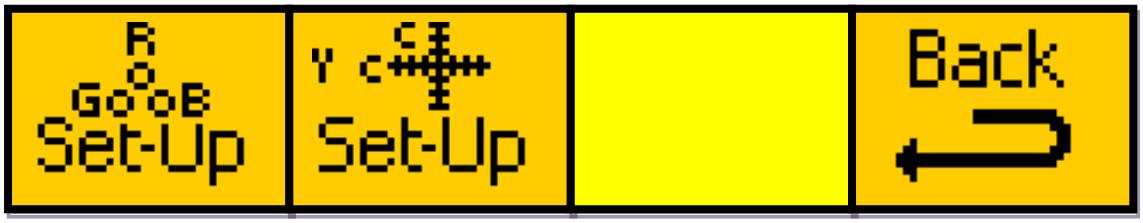
Menus 24-27: Proc amp gain (PAL, mV)



Menu Num.	Heading	Function
24	Luma gain adjustment	This menu adjusts the luma gain between 0% and 200%.
25	Chroma gain adjustment	This menu adjusts the chroma gain between 0% and 200%.
26	Black lift	This menu adjusts the black lift between -200mV and +200mV.
27	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 16-19**)

Menus 28-31: RGB/YCC main menu



Menu Num.	Heading	Function
28	RGB setup	Pressing the button takes you to the RGB legalisation menu (Go To **Menus 32-35**)
29	YCC setup	Pressing the button takes you to the YCC legalisation menu (Go To **Menus 44-47**)
30	---	---
31	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 04-07**)

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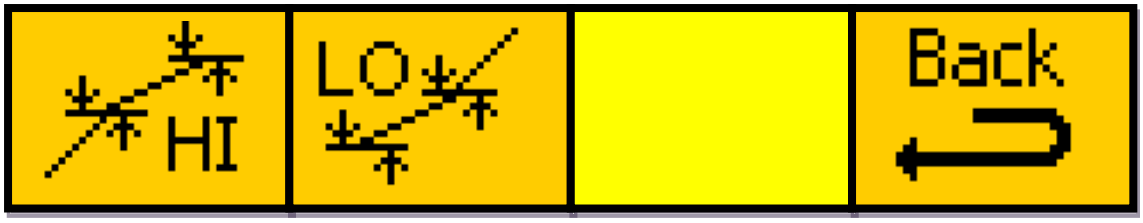
Menus 32-35: RGB hi/lo menu

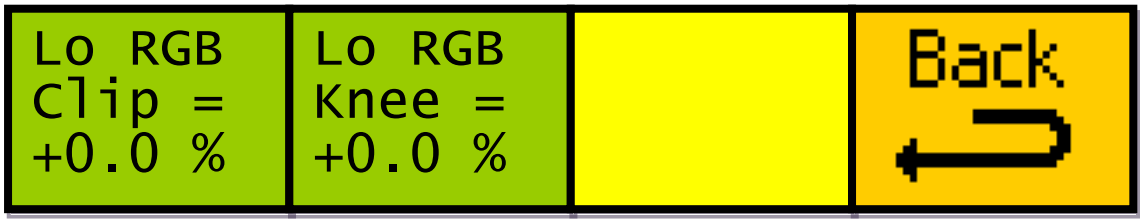


Menu Num.	Heading	Function
32	RGB high clip and knee setup	Pressing the button takes you to the RGB high clip and knee adjustment menu (Go To **Menus 36-39**)
33	RGB low clip and knee setup	Pressing the button takes you to the RGB low clip and knee adjustment menu (Go To **Menus 40-43**)
34	---	---
35	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 28-31**)

Menus 36-39: RGB high clip and knee

Menu Num.	Heading	Function
36	RGB high clip	This menu adjusts the high RGB clip value. Values are in percent.
37	RGB high knee	This menu adjusts the high RGB knee value. Values are in percent.
38	---	---
39	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 32-35**)

Menus 40-43: RGB low clip and knee



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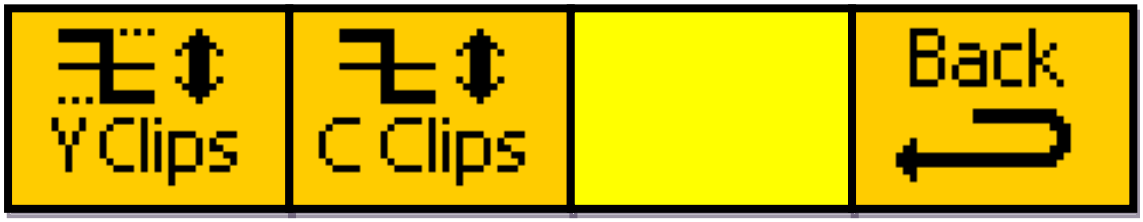
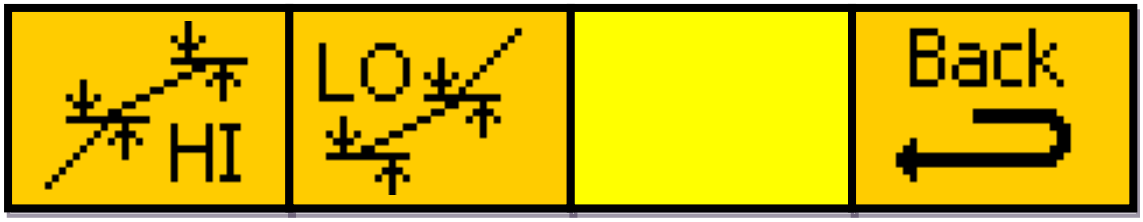
Menu Num.	Heading	Function
40	RGB low clip	This menu adjusts the low RGB clip value. Values are in percent.
41	RGB low knee	This menu adjusts the low RGB knee value. Values are in percent.
42	---	---
43	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 32-35**)

Menus 44-47: YCC clipping main menu



Menu Num.	Heading	Function
44	YCC luma setup	Pressing the button takes you to the YCC luma menu (Go To **Menus 48-51**)
45	YCC chroma setup	Pressing the button takes you to the YCC chroma menu (Go To **Menus 60-63**)
46	---	---
47	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 28-31**)

Menus 48-51: YCC Y hi/lo menu



Menu Num.	Heading	Function
48	YCC luma high clip and knee setup	Pressing the button takes you to the YCC luma high clip and knee adjustment menu (Go To **Menus 52-55**)
49	YCC luma low clip	Pressing the button takes you to the

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	and knee setup	YCC luma low clip and knee adjustment menu (Go To **Menus 56-59**)
50	---	---
51	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 44-47**)

Menus 52-55: YCC high clip and knee

Menu Num.	Heading	Function
52	YCC Y high clip	This menu adjusts the high YCC luma clip value. Values are in percent.
53	YCC Y high knee	This menu adjusts the high YCC luma knee value. Values are in percent.
54	---	---
55	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 48-51**)

Menus 56-59: YCC low clip and knee

Menu Num.	Heading	Function
56	YCC Y low clip	This menu adjusts the low YCC luma clip value. Values are in percent.
57	YCC Y low knee	This menu adjusts the low YCC luma knee value. Values are in percent.
58	---	---
59	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 48-51**)

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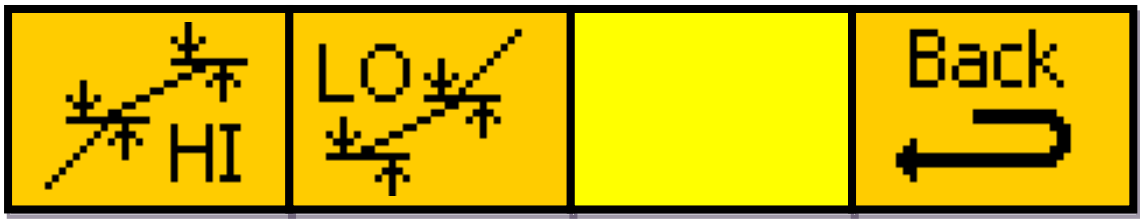
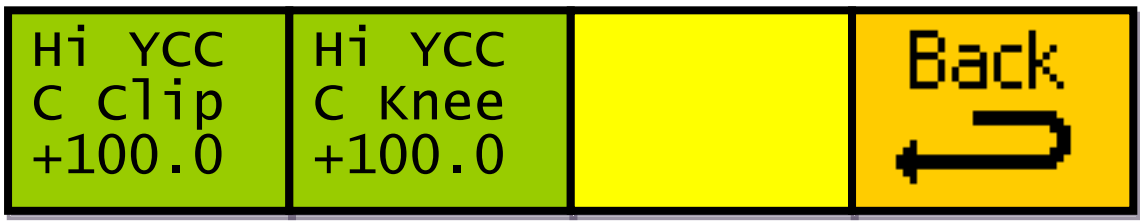
Menus 60-63: YCC CC hi/lo menu



Menu Num.	Heading	Function
60	YCC chroma high clip and knee setup	Pressing the button takes you to the YCC chroma high clip and knee adjustment menu (Go To **Menus 64-67**)
61	YCC chroma low clip and knee setup	Pressing the button takes you to the YCC chroma low clip and knee adjustment menu (Go To **Menus 68-71**)
62	---	---
63	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 44-47**)

Menus 64-67: YCC CC high clip and knee



Menu Num.	Heading	Function
64	YCC C high clip	This menu adjusts the high YCC chroma clip value. Values are in percent.
65	YCC C high knee	This menu adjusts the high YCC chroma knee value. Values are in percent.
66	---	---
67	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 60-63**)

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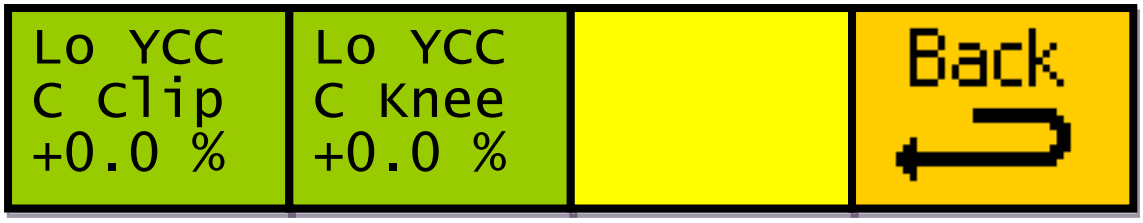
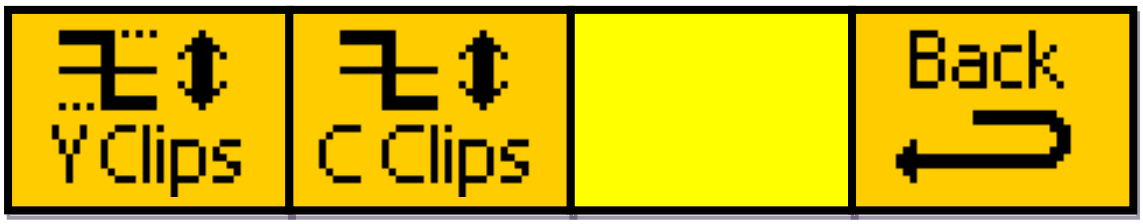
Menus 68-71: YCC CC low clip and knee



Menu Num.	Heading	Function
68	YCC C low clip	This menu adjusts the low YCC chroma clip value. Values are in percent.
69	YCC C low knee	This menu adjusts the low YCC chroma knee value. Values are in percent.
70	---	---
71	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 60-63**)

Menus 72-75: Composite clipping main menu



Menu Num.	Heading	Function
72	Component luma setup	Pressing the button takes you to the Component luma menu (Go To **Menus 76-79**)
73	Component chroma setup	Pressing the button takes you to the Component chroma menu (Go To **Menus 88-91**)
74	---	---
75	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 100-103**)

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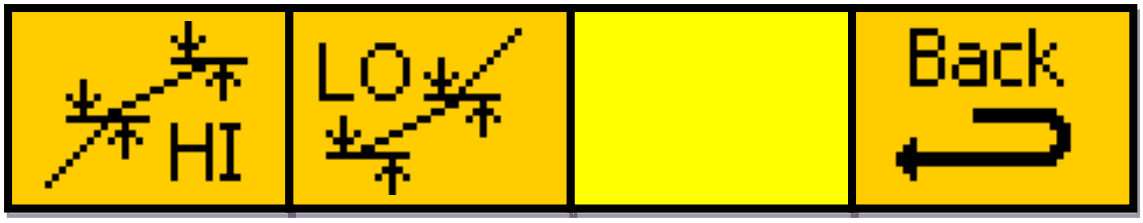
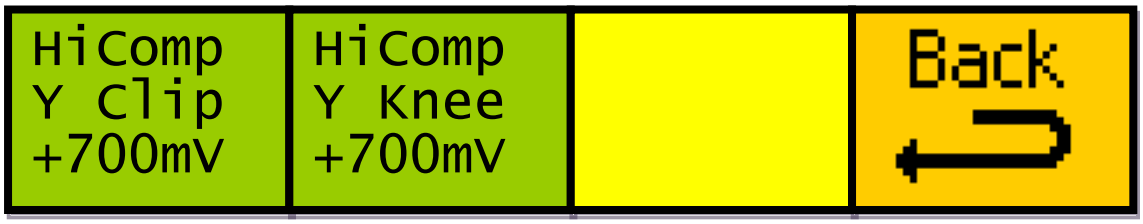
Menus 76-79: Composite Y hi/lo menu



Menu Num.	Heading	Function
76	Comp luma high clip and knee setup	Pressing the button takes you to the Comp luma high clip and knee adjustment menu (Go To **Menus 80-83**)
77	Comp luma low clip and knee setup	Pressing the button takes you to the Comp luma low clip and knee adjustment menu (Go To **Menus 84-87**)
78	---	---
79	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 72-75**)

Menus 80-83: Composite Y high clip and knee (PAL, mV)



Menu Num.	Heading	Function
80	Comp Y high clip	This menu adjusts the high Comp luma clip value. Values are in mV.
81	Comp Y high knee	This menu adjusts the high Comp luma clip knee value. Values are in mV.
82	---	---
83	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 76-79**)

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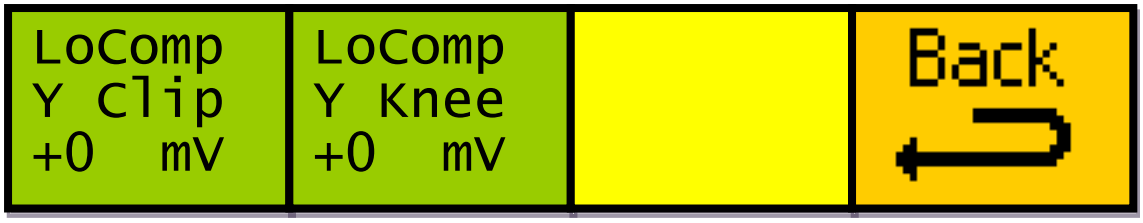
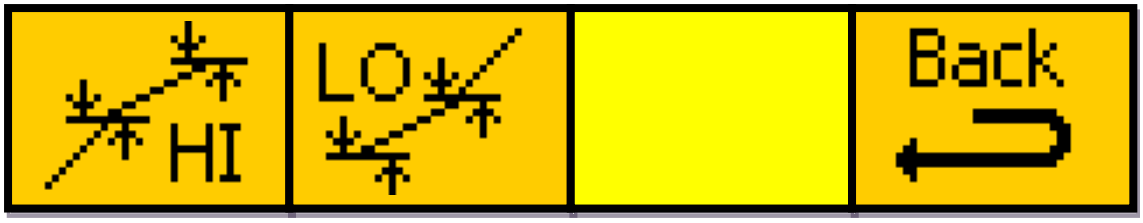
Menus 84-87: Composite Y low clip and knee (PAL, mV)



Menu Num.	Heading	Function
	Comp Y low clip	This menu adjusts the low Comp luma clip value. Values are in mV.
	Comp Y low knee	This menu adjusts the low Comp luma clip knee value. Values are in mV.
	---	---
	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 76-79**)

Menus 88-91: Composite C hi/lo menu



Menu Num.	Heading	Function
88	Comp composite high clip and knee setup	Pressing the button takes you to the Comp composite high clip and knee adjustment menu (Go To **Menus 92-95**)
89	Comp composite low clip and knee setup	Pressing the button takes you to the Comp composite low clip and knee adjustment menu (Go To **Menus 96-99**)
90	---	---
91	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 72-75**)

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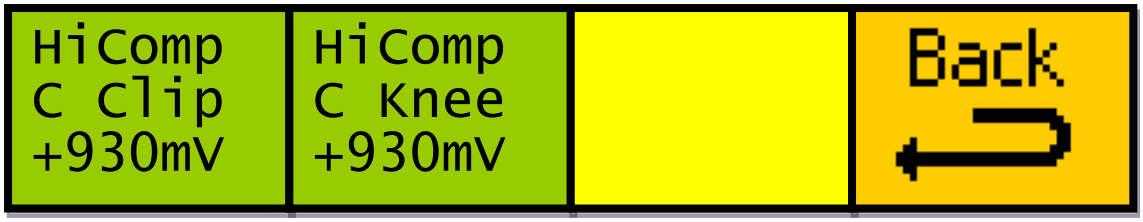
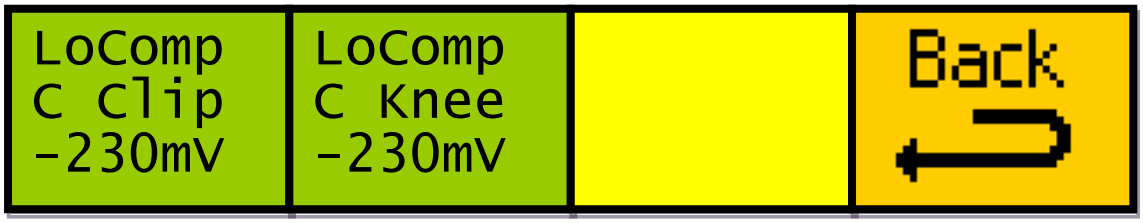
Menus 92-95: Composite C high clip and knee (PAL, mV)



Menu Num.	Heading	Function
92	Comp C high clip	This menu adjusts the high Comp component clip value. Values are in mV.
93	Comp C high knee	This menu adjusts the high Comp component clip knee value. Values are in mV.
94	---	---
95	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 88-91**)

Menus 96-99: Composite C low clip and knee (PAL, mV)



Menu Num.	Heading	Function
96	Comp C low clip	This menu adjusts the low Comp component clip value. Values are in mV.
97	Comp C low knee	This menu adjusts the low Comp component clip knee value. Values are in mV.
98	---	---
99	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 88-91**)

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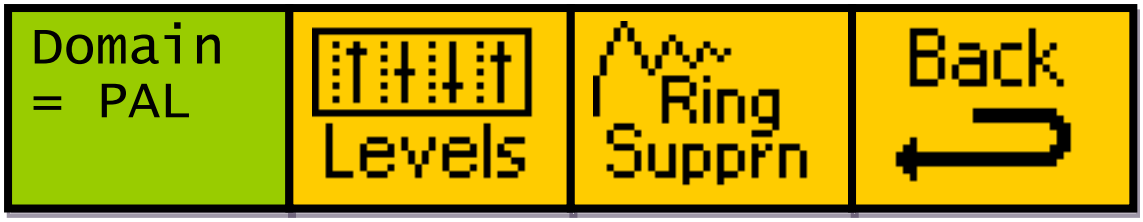
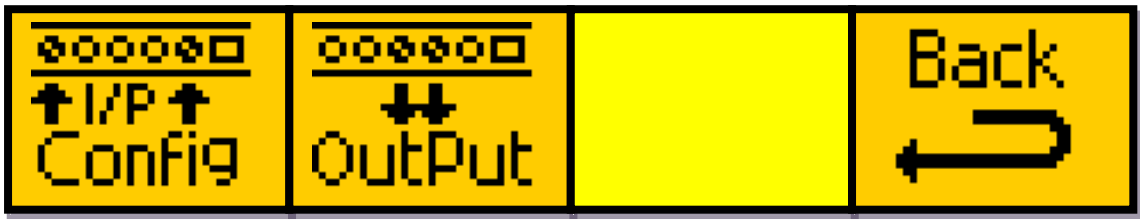
Menus 100-103: Component main menu



Menu Num.	Heading	Function
100	Legaliser domain	This menu sets the domain used by the legaliser. For more information Go To **4.1.3**
101	Comp setup	Pressing the button takes you to the Comp settings menu (Go To **Menus 72-75**)
102	Ring suppression setup	Pressing the button takes you to the ring suppression settings menu (Go To **Menus 208-211**)
103	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 04-07**)

Menus 104-107: Input/output menu



Menu Num.	Heading	Function
104	Input video setup	Pressing the button takes you to the input video settings menu (Go To **Menus** 108-111)
105	Output video setup	Pressing the button takes you to the output video settings menu (Go To **Menus 116-119**)
106	---	---
107	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 08-11**)

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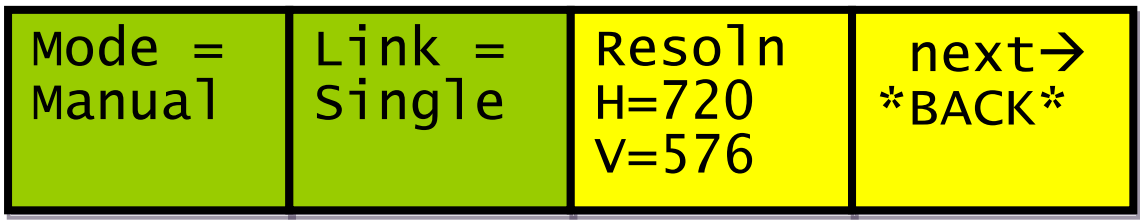
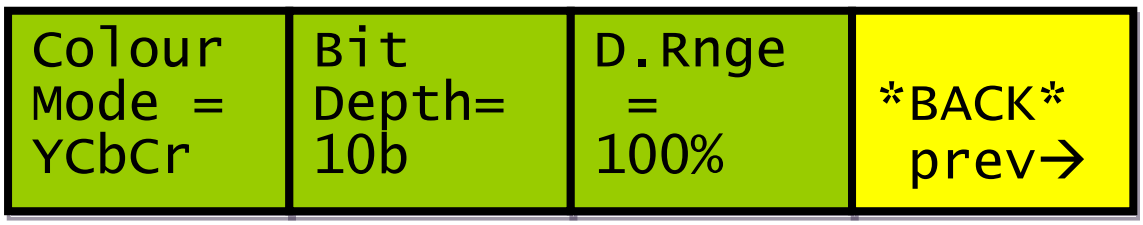
Menus 108-111: Input details menu 1/2



Menu Num.	Heading	Function
108	Input mode	This menu toggles the input video mode between manual and SMPTE 352. For more information Go To **4.2.2**
109	Input video link type	Switches the link mode to either Single link or dual-link mode. For more information on dual-link, Go To **4.2.2**
110	Input video resolution	This is a display of the input video resolution, as detected by the **LE-2**. Display is of visible lines/pixels, not the total number of lines/pixels.
111	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 104-107**) Pressing the next button on the panel will take you to the next menu in the nested menu sequence (Go To **Menus 112-115**)

Menus 112-115: Input details menu 2/2



Menu Num.	Heading	Function
112	Input video colour mode	This menu toggles the input video colour mode between YCbCr and RGB.
113	Input video bit depth	This menu toggles the input video bit depth between 10 and 12 bit.

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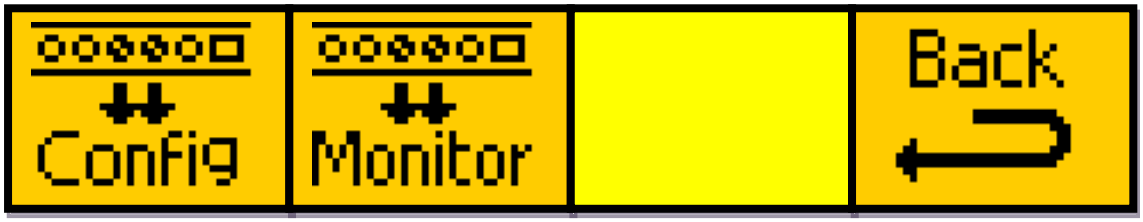
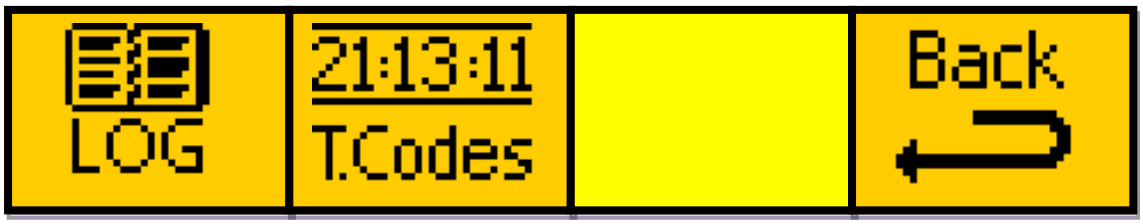
114	Input video dynamic range	This menu cycles the input video dynamic range between 100%, 200% and 400%.
115	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 104-107**) Pressing the prev button on the panel will take you to the previous menu in the nested menu sequence (Go To **Menus** 108-111)

Menus 116-119: Output menu



Menu Num.	Heading	Function
116	Output video config	Pressing the button takes you to the output video configuration settings menu (Go To **Menus 224-227**)
117	Output video monitor settings	Pressing the button takes you to the output video monitor settings (Go To **Menus 220-223**)
118	---	---
119	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 104-107**)

Menus 120-123: Utilities menu



Menu Num.	Heading	Function
120	Log mode settings	Pressing the button takes you to the logging setup menu (Go To **Menus 124-127**)
121	Time code settings	Pressing the button takes you to the

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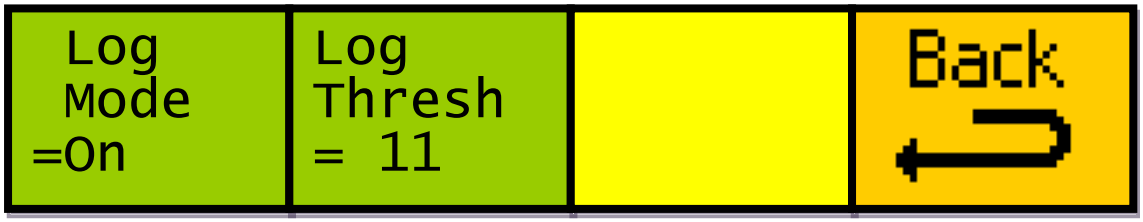
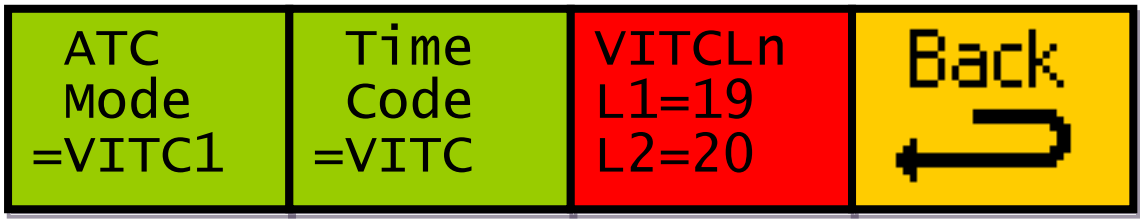
		time code setup menu (Go To **Menus 128-131**)
122	---	---
123	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 08-11**)

Menus 124-127: Data logger menu



Menu Num.	Heading	Function
124	Log mode enable	This menu enables or disables logging mode. For more information on the logging function of the **LE-2**, Go To **4.3.3**
125	Log threshold	This menu sets the level at which an illegal pixel is considered a severe failure.
126	---	---
127	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 120-123**)

Menus 128-131: Time code menu



Menu Num.	Heading	Function
128	ATC mode	This menu sets the Ancillary time code mode between LTC, VITC1 and VITC2. For more information on the time code function Go To **4.3.4**

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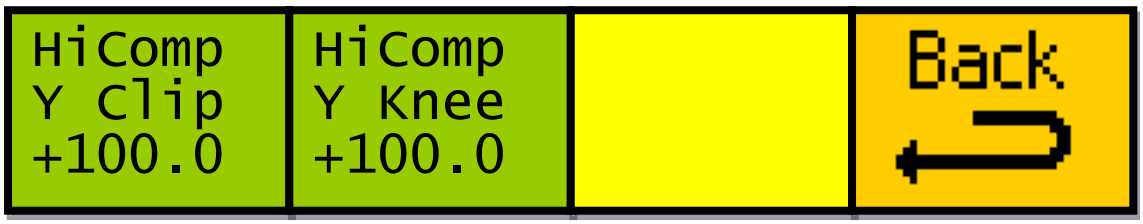
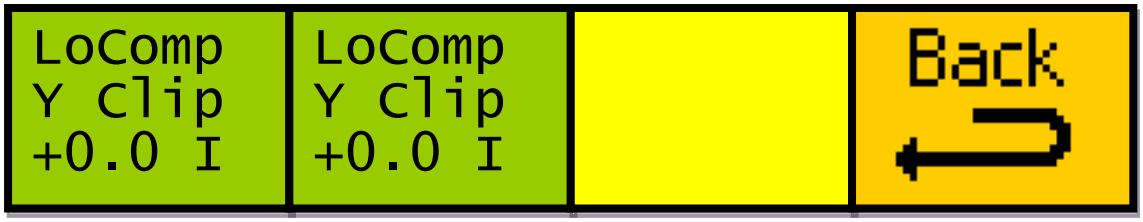
129	Time code mode	This menu sets the time code mode to VITC, LTC or ATC.
130	VITC line numbers	This menu sets the VITC line numbers.
131	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 120-123**)

Menus 132-135: Comp Y high clip and knee (NTSC, IRE)



Menu Num.	Heading	Function
132	Comp Y high clip	This menu adjusts the high Comp luma clip value. Values are in IRE.
133	Comp Y high knee	This menu adjusts the high Comp luma clip knee value. Values are in IRE.
134	---	---
135	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 76-79**)

Menus 136-139: Comp Y low clip and knee (NTSC, IRE)



Menu Num.	Heading	Function
136	Comp Y low clip	This menu adjusts the low Comp luma clip value. Values are in IRE.
137	Comp Y low knee	This menu adjusts the low Comp luma clip knee value. Values are in IRE.
138	---	---
139	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 76-79**)

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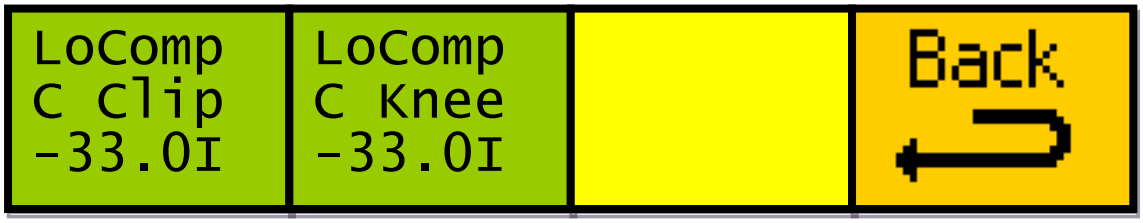
Menus 140-143: Comp C high clip and knee (NTSC, IRE)

Menu Num.	Heading	Function
140	Comp C high clip	This menu adjusts the high Comp component clip value. Values are in IRE.
141	Comp C high knee	This menu adjusts the high Comp component clip knee value. Values are in IRE.
142	---	---
143	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 88-91**)

Menus 144-147: Comp C low clip and knee (NTSC, IRE)



Menu Num.	Heading	Function
144	Comp C low clip	This menu adjusts the low Comp component clip value. Values are in IRE.
145	Comp C low knee	This menu adjusts the low Comp component clip knee value. Values are in IRE.
146	---	---
147	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 88-91**)

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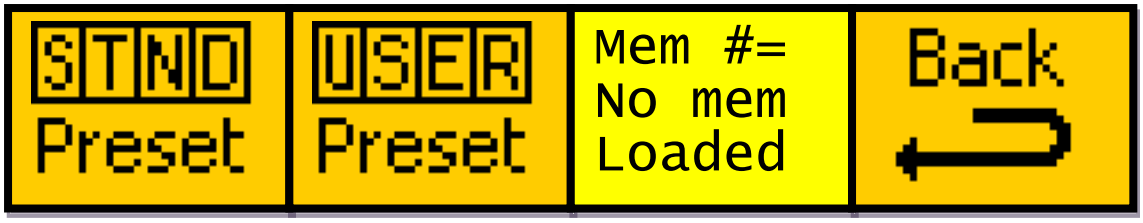
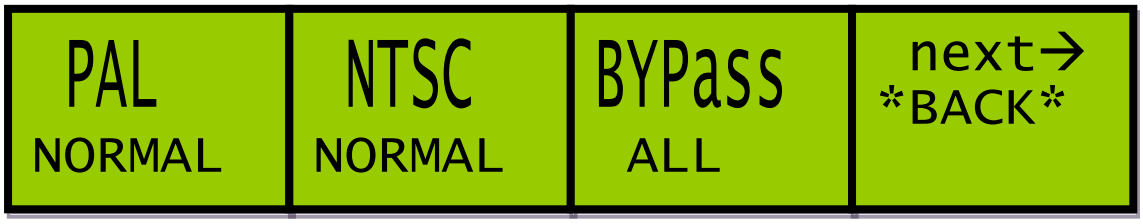
Menus 148-151: Memories menu



Menu Num.	Heading	Function
148	Preset memories	Pressing the button takes you to the preset memory loading menus (Go To **Menus 152-155**)
149	User memories	Pressing the button takes you to the user memory load and save menus (Go To **Menus 160-163**)
150	Loaded Memory	Displays the currently loaded memory, if any This will display 'no mem loaded' upon any change to a loaded memory, to indicate something has been changed.
151	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 00-03**)

Menus 152-155: Preset memories menu 1/2



Menu Num.	Heading	Function
152	Load preset 1	Pressing this button loads the 'PAL normal' preset memory. For details on the preset memories, see section **5.1.2**
153	Load preset 2	Pressing this button loads the 'NTSC normal' preset memory.
154	Load preset 3	Pressing this button loads the 'Bypass all' preset memory.
155	Back	Pressing the button takes you to the

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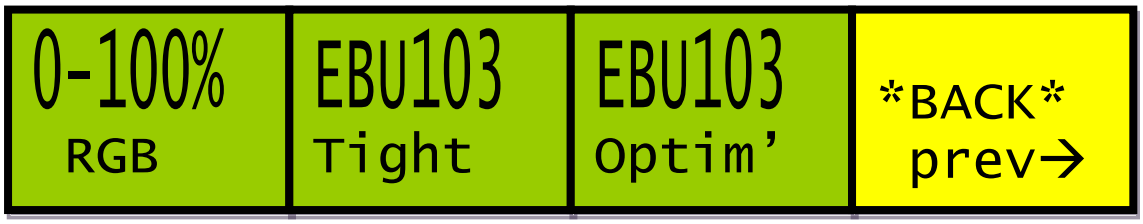
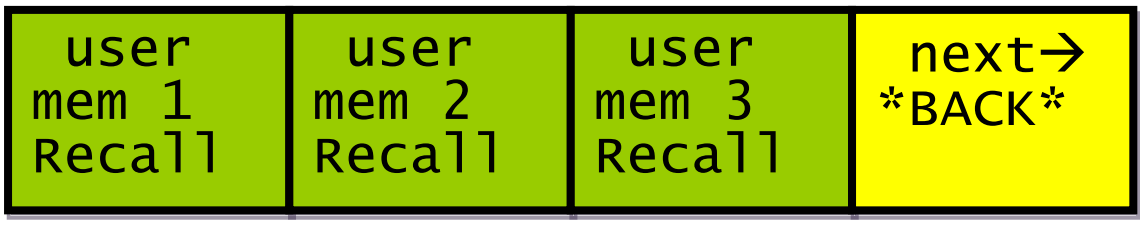
		previous level of menus (Go To **Menus 148-151**) Pressing the next button on the panel will take you to the next menu in the nested menu sequence (Go To **Menus 156-159**)

Menus 156-159: Preset memories menu 2/2



Menu Num.	Heading	Function
156	Load preset 4	Pressing this button loads the 'PAL normal' preset memory. For details on the preset memories, see section **5.1.2**
157	Load preset 5	Pressing this button loads the 'PAL normal' preset memory.
158	Load preset 6	Pressing this button loads the 'PAL normal' preset memory.
159	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 148-151**) Pressing the prev button on the panel will take you to the previous menu in the nested menu sequence (Go To **Menus 152-155**)

Menus 160-163: User memories menu 1/4



Menu Num.	Heading	Function

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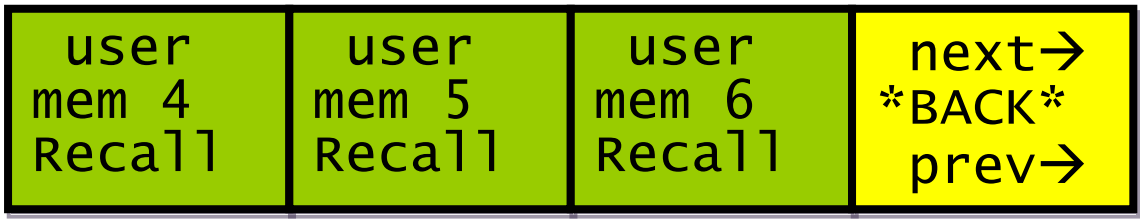
160	Load user memory 1	Pressing this button loads the first user memory. For details on the user memories, see section **5.1.3**
161	Load user memory 2	Pressing this button loads the second user memory.
162	Load user memory 3	Pressing this button loads the third user memory.
163	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 148-151**) Pressing the next button on the panel will take you to the next menu in the nested menu sequence (Go To **Menus 164-167**)

Menus 164-167: User memories menu 2/4



Menu Num.	Heading	Function
164	Load user memory 4	Pressing this button loads the fourth user memory. For details on the user memories, see section **5.1.3**
165	Load user memory 5	Pressing this button loads the fifth user memory.
166	Load user memory 6	Pressing this button loads the sixth user memory.
167	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 148-151**) Pressing the next button on the panel will take you to the next menu in the

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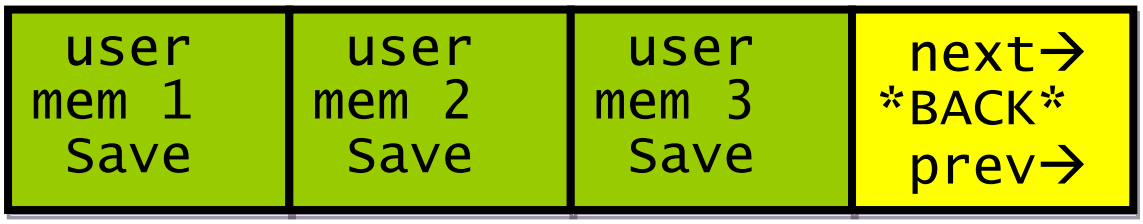
		nested menu sequence (Go To **Menus 168-171**) Pressing the prev button on the panel will take you to the previous menu in the nested menu sequence (Go To **Menus 160-163**)

Menus 168-171: User memories menu 3/4



Menu Num.	Heading	Function
168	Save user memory 1	Pressing this button saves the current unit settings to user memory 1. For details on the user memories, see section **5.1.3**
169	Save user memory 2	Pressing this button saves the current unit settings to user memory 2.
170	Save user memory 3	Pressing this button saves the current unit settings to user memory 3.
171	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 148-151**) Pressing the next button on the panel will take you to the next menu in the nested menu sequence (Go To **Menus 172-175**) Pressing the prev button on the panel will take you to the previous menu in the nested menu sequence (Go To **Menus 164-167**)

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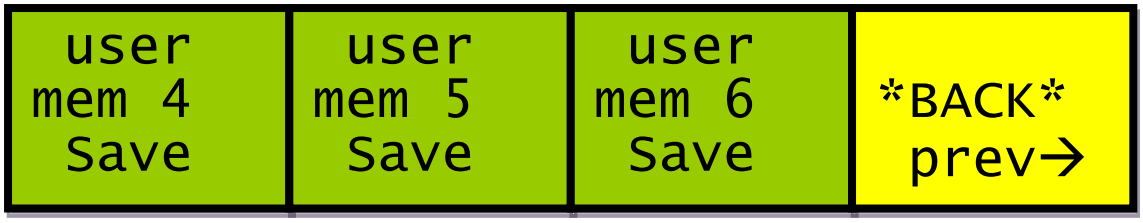
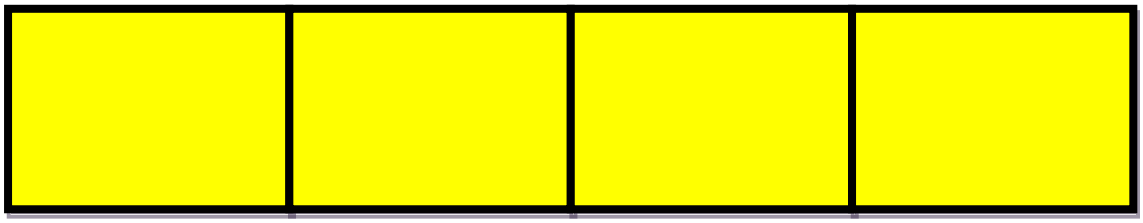
Menus 172-175: User memories menu 4/4



Menu Num.	Heading	Function
172	Save user memory 4	Pressing this button saves the current unit settings to user memory 4. For details on the user memories, see section **5.1.3**
173	Save user memory 5	Pressing this button saves the current unit settings to user memory 5.
174	Save user memory 6	Pressing this button saves the current unit settings to user memory 6.
175	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 148-151**) Pressing the prev button on the panel will take you to the previous menu in the nested menu sequence (Go To **Menus 168-171**)

Menus 176-179: Blank



Menu Num.	Heading	Function
176	---	---
177	---	---
178	---	---
179	---	---

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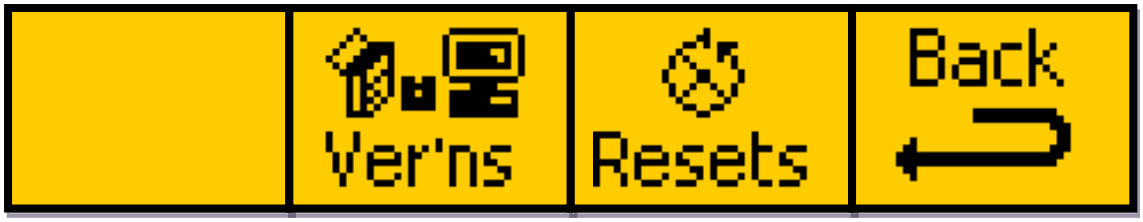
Menus 180-183: System menu



Menu Num.	Heading	Function
180	Blank	---
181	Versions menu	Pressing the button takes you to the versions menu, which includes the software upgrade menu (Go To **Menus 184-187**)
182	Resets menu	Pressing the button takes you to the unit resets menu (Go To **Menus 188-191**)
183	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 08-11**)

Menus 184-187: Software menu

Menu Num.	Heading	Function
184	**LE-2** version number	This menu displays the version number of the **LE-2**
185	---	---
186	Upgrade software menu	Pressing the button takes you to the upgrade software menu (Go To **Menus 192-195**)
187	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 180-183**)

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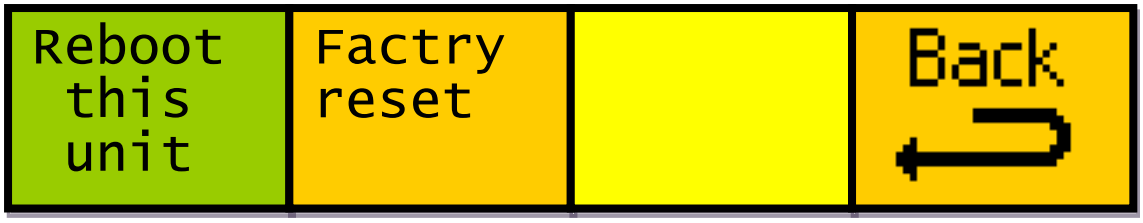
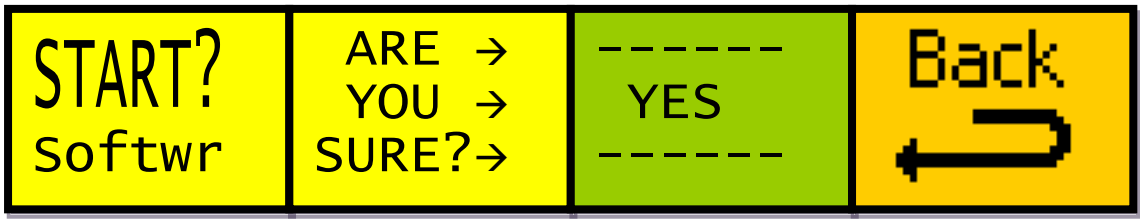
Menus 188-191: Resets menu



Menu Num.	Heading	Function
188	Reboot unit	Pressing this will reset the LE-2. The unit should finish rebooting within 30 seconds or so, and it should have the same settings loaded as it had before the reset button was pressed.
189	Factory reset	Pressing the button takes you to the factory reset menu (Go To **Menus 196-199**)
190	---	---
191	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 180-183**)

Menus 192-195: Software upgrade menu



Menu Num.	Heading	Function
192	---	---
193	---	---
194	Software upgrage confirmation	Pressing this button will confirm you want to update the software of the LE-2, and will jump to the message displayed on **Menus 200-203**. The details of the update procedure can be found in section **8**
195	Back	Pressing the button takes you to the previous level of menus (Go To

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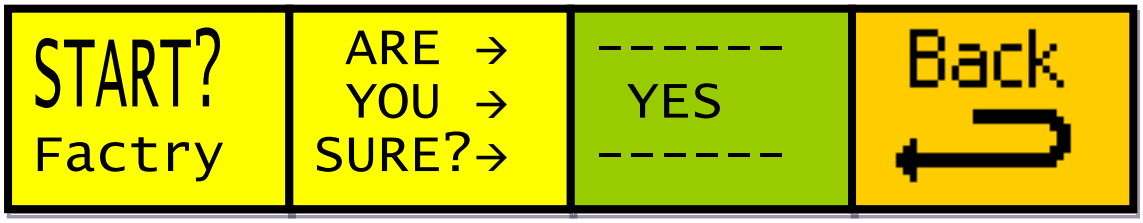
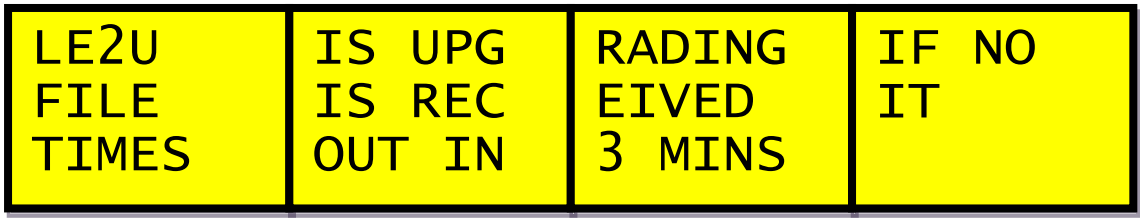
		Menus 184-187)

Menus 196-199: Factory reset menu



Menu Num.	Heading	Function
196	---	---
197	---	---
198	Factory Reset confirmation	Pressing this button will confirm you want to perform reset the **LE-2** to its factory settings. The menu icon will change to 'please wait' while the action is performed. **WARNING!** Performing a factory reset will permanently erase all user memories that have been stored, as well as erasing the current power-on state.
199	Back	Pressing the button takes you to the previous level of menus (Go To Menus 188-191)

Menus 200-203: Software upgrade in progress info menu



Menu Num.	Heading	Function
200	---	---
201	---	---
202	---	---
203	---	---

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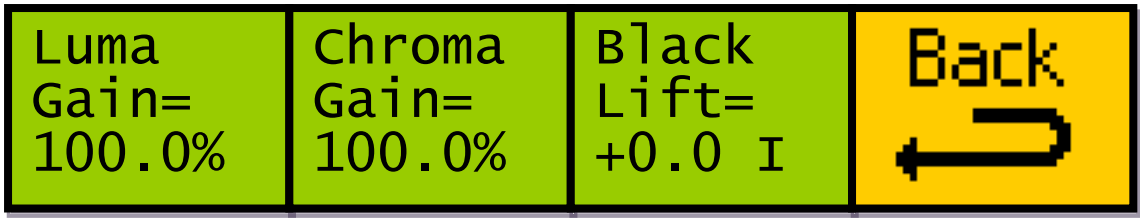
Menus 204-207: Proc amp gain (NTSC, IRE)



Menu Num.	Heading	Function
204	Luma gain adjustment	This menu adjusts the luma gain between 0% and 200%.
205	Chroma gain adjustment	This menu adjusts the chroma gain between 0% and 200%.
206	Black lift	This menu adjusts the black lift between -30.0 IRE and +30.0 IRE.
207	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 16-19**)

Menus 208-211: Ring suppression (RGB, percentage)

Menu Num.	Heading	Function
208	Ring suppression status	This menu cycles the Ring suppression between off, on and auto. For more information on the ring suppression, Go To **4.3.1**
209	Ring suppression high clip	This menu sets the value for the high clip limit of the ring suppression. Values are in percent.
210	Ring suppression low clip	This menu sets the value for the low clip limit of the ring suppression. Values are in percent.
211	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 100-103**)

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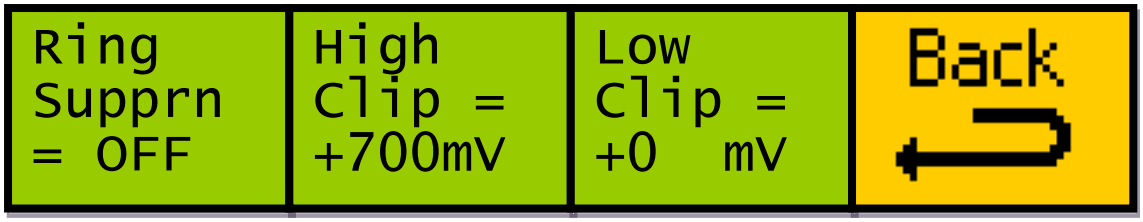
Menus 212-215: Ring suppression (PAL, mV)



Menu Num.	Heading	Function
212	Ring suppression status	This menu cycles the Ring suppression between off, on and auto. For more information on the ring suppression, Go To **4.3.1**
213	Ring suppression high clip	This menu sets the value for the high clip limit of the ring suppression. Values are in mV.
214	Ring suppression low clip	This menu sets the value for the low clip limit of the ring suppression. Values are in mV.
215	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 100-103**)

Menus 216-219: Ring suppression (NTSC, IRE)

Menu Num.	Heading	Function
216	Ring suppression status	This menu cycles the Ring suppression between off, on and auto. For more information on the ring suppression, Go To **4.3.1**
217	Ring suppression high clip	This menu sets the value for the high clip limit of the ring suppression. Values are in IRE.
218	Ring suppression low clip	This menu sets the value for the low clip limit of the ring suppression.

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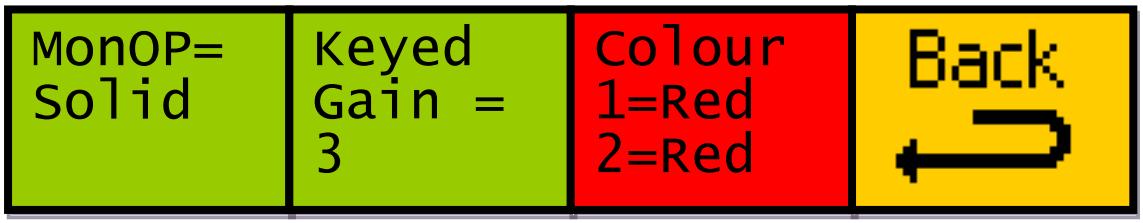
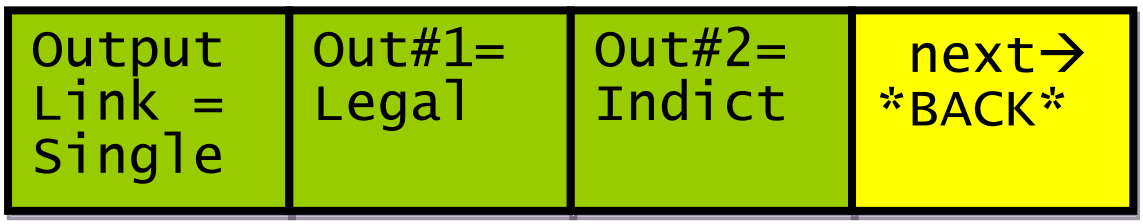
		Values are in IRE.
219	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 100-103**)

Menus 220-223: Monitor output menu



Menu Num.	Heading	Function
220	Indicate output display type	This menu sets the type of indicate out indication between solid, 1 colour flash, 2 colour flash and 2 colour zebra mode. For more information on the indicate output settings, Go To **4.2.3**
221	Indicate output gain	This menu sets the gain for the indicate output. A higher number makes each illegal pixel a more solid colour, whereas a low number makes the indicate output more of a gradual shading of illegal areas of the picture.
222	Indicate output colours	This menu sets the colours for the indicate output. Colour 2 is only used in 2 colour flash and zebra modes.
223	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 116-119**)

Menus 224-227: Configure outputs menu 1/2



Menu Num.	Heading	Function
224	Output video link mode	This menu toggles the output video mode between single and dual-link.

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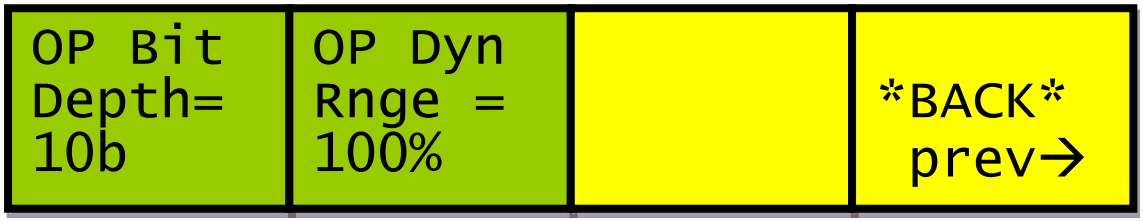
		For more information on the output video settings, Go To **4.2.3**
225	Output 1 type	This menu sets the type of output video to be present on output 1 of the i/o card. Options are Legal, Raw or Indicate.
226	Output 2 type	This menu sets the type of output video to be present on output 2 of the i/o card. Options are Legal, Raw or Indicate. If the output video link mode is set to dual-link, this menu will be automatically set to the same as output 1.
227	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 116-119**)

Menus 228-231: Configure outputs menu 2/2



Menu Num.	Heading	Function
228	Output video bit depth	This menu sets the output video bit depth to either 10 or 12 bit.
229	Output video dynamic range	This menu sets the output video dynamic range to 100%, 200% or 400%.
230	---	---
231		Pressing the button takes you to the previous level of menus (Go To **Menus 116-119**)

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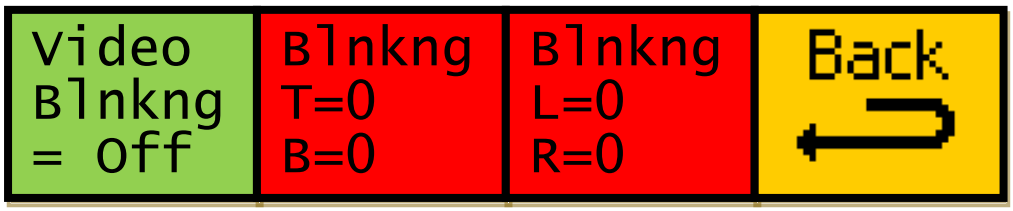
Menus 232-235: Blanking menu



Menu Num.	Heading	Function
232	Blanking status	This menu the video blanking to On or Off. See section 4.3.2 for more information.
233	Top	This menu sets the number of lines that are blanked from the top of the picture. See section 4.3.2 for more information.
233	Bottom	This menu sets the number of lines that are blanked from the top of the picture. See section 4.3.2 for more information.
234	Left	This menu sets the number of pixels that are blanked from the left of the picture. See section 4.3.2 for more information.
234	Right	This menu sets the number of pixels that are blanked from the right of the picture. See section 4.3.2 for more information.
235	Back	Pressing the button takes you to the previous level of menus (Go To **Menus 120-123**).Menus 120-123Menus 120-123Menus 120-123Menus 120-123Menus 120-123

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10 Technical Appendix

10.1 GPI/Tally/RS232 technical information.

The Processor card has an RJ-45 connector with GPI, Tally and RS232 connections as shown below:

1	GPI-1	White/Orange
2	Not Used	Orange
3	GPI-2	White/Green
4	GND	Blue
5	RS232 TX	White/Blue
6	RS232 RX	Green
7	Not Used	White/Brown
8	Not Used	Brown

Table 1 GPI and RS232 pin-out on RJ-45.

10.1.1 GPI Inputs.

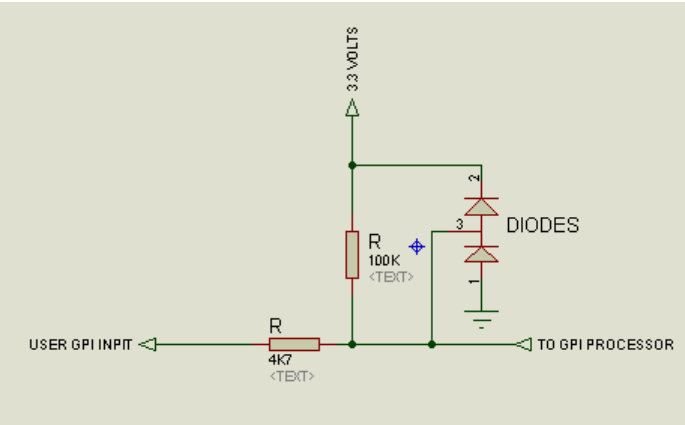

Figure 10-1 Typical GPI Input

10.1.2 GPI Splitter

The soft panel comms and GPI connections are on the same RJ45 connector. Eyeheight provide a GPI Splitter block which enables simultaneous use of the RJ45 for the comms and the RJ45 for the GPI's. The Splitter has the following pin-out which is also provided on a label on the splitter.

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Figure 10-2 GPI Splitter. Has 2 RJ-45 Sockets, one for the Comms and one for the GPI's

1	DO NOT CONNECT	White/Orange
2	DO NOT CONNECT	Orange
3	DO NOT CONNECT	White/Green
4	GND	Blue
5	RS232 TX	White/Blue
6	RS232 RX	Green
7	Not Used	White/Brown
8	Not Used	Brown

Table 2 GPI Splitter, comms (Soft Panel) connection.

1	GPI-1	White/Orange
2	GPI-2	Orange
3	DO NOT CONNECT	White/Green
4	GND	Blue
5	Not Used	White/Blue
6	DO NOT CONNECT	Green
7	Not Used	White/Brown
8	Not Used	Brown

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Table 3 GPI Splitter, GPI connection.

THE CONNECTIONS LABELLED "DO NOT CONNECT" *MUST* BE LEFT COMPLETELY UNCONNECTED.

GPI's are normally activated by a short to ground. The GPI has its own internal pull-up resistor. If the user is interfacing with logic then

- Vhigh = +12V>Vin>+3V
- Vlow = +0.3V>Vin>0V

10.1.3 RS232 Interface.

This loosely follows the pin convention of EIA-561 which is a standard for RS232 on an RJ45 cable. Only TX, RX and Signal ground (pin 4) are implemented. For the LE-2n the following RS232 parameters apply:

- 115Kbaud
- 8 Bits, no parity
- 1 Stop bit.

Eyeheight provide a Serial to USB lead with the LE-2n which is normally used for the soft panel control using this port.

10.2 Technical Specification

10.2.1 Description

Provides legalisation of the SD (StandardDef version), SD/HD (MultiDef version) or dual link (4:4:4) (UltraDef version) input signal with full 10 bit processing throughout.

NOTE: Indicate output is NOT available in dual link output mode.

10.2.2 Features

- Composite, YUV and RGB colour spaces and combined RGB+composite with two independent outputs for "Legalise" and user controllable "Legal/Indicate".
- Adjustable clipping levels and soft clipping knee levels.
- Integral luma and chroma gain, black level adjustment & hue rotation.

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- EBU-R103 standard SDI legalisation settings and 7.5 IRE or 0 IRE Pedestal with 6 user memories and common presets.
- Log output with timecode and PC viewer programme. Automation Port using simple protocol for presets/memories
- Unique severity display mode on monitoring output.
- Firmware and software fully updatable by file upload*
- Mechanical relay bypass option available.
- Optional web based java soft panel and specific "web app" available.*

*Not available on the MX-9 chassis

10.2.3 Formats

- **StandardDef version** - 625/50, 525/59.94
- **MultiDef version** - 625/50, 525/59.94, 1080i/23.98psf/24psf/23.98p/24p/25p/50i/29.97p/30p/59.94i/60i, 720p/23.98/24/25/29.97/30/50/59.84/60
- **UltraDef version**

Single Link –

625/50, 525/59.94,
1080i/23.98psf/24psf/23.98p/24p/25p/50i/29.97p/30p/59.94i/60i,
720p/23.98/24/25/29.97/30/50/59.84/60

Dual-Link 4:4:4 -
1080i/23.98psf/24psf/23.98p/24p/25p/50i/29.97p/30p/59.94i/60i,
720p/23.98/24/25/29.97/30/50/59.84/60

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