



# OL-2HD

# OL-2AHD

OL-2HD/OL-2AHD  
(Revised 18/02/04 - preliminary)

# Table of Contents

1 System Overview .....	4
1.1 Legaliser Processing.....	4
1.2 Associated Equipment for the OL_2HD .....	5
1.2.1 Chassis .....	5
1.2.2 Control Equipment for the OL_2HD .....	6
2 Installation .....	7
2.1 Installation of the OL_2HD product.....	7
3 Operation .....	8
3.1 Manual control of the OL-2HD .....	8
3.2 Automation Control of the OL-2HD .....	8
3.3 Operational Menus for the OL-2HD .....	8

# Table of Figures

Figure 1-1 Legaliser Block Diagram.....	5
Figure 1-2 flexiPanel (FP-9) .....	6
Figure 1-3 deskPanel (FP-10) .....	6
Figure 2-1 OL_2HD Connections .....	7
Figure 2-2 OL_2AHD Connections.....	7

# I System Overview

The OL-2HD is a full-featured Legaliser system using the eyeheight Genetics platform. The main features of the OL-2HD series of legalisers are as follows:

- Provides Legalisation of the HD-SDI Input signal with full 10 bit processing throughout.
- Two Independent HD-SDI outputs for "Legalise" and user controllable "Raw/Legal/Indicate" (OL-2HDA only)
- Indicate mode can show different colours for R,G and B components which are processed (OL-2HDA only).
- Adjustable Clipping Levels.
- Adjustable soft clipping knee levels.
- Highly effective overshoot and undershoot suppression on the luminance signal.
- Analog blanking generator.
- Integral luma and chroma gain, black level adjustment & hue rotation.
- EBU 2003 standard legalisation settings.
- 6 User Memories.

## 1.1 Legaliser Processing

A Block diagram of the legaliser is shown below. The HD-SDI Input firstly goes to the Proc Amp Section. This 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  $\pm 180^\circ$  of hue rotation. These controls are accessed via the "Picture" menu.

The next section is a cropping or blanking generator that is accessed from the "Utils" menu.

After the crop is the legaliser, which consists of a colour space conversion from Y,Cr,Cb to R,G,B. This first conversion then enters the RGB Clip unit. This has three purposes:

To Clip, and therefore legalise the incoming signal.

To provide a signal that indicates that a particular part of the signal is legal or illegal ("Not in clip", or "In clip").

To provide information to a "Colour Field Generator" (Not shown) to show parts of the picture that have been modified by the legaliser on the HD-SDI Output.

The Clipping section consists of a 10 bit RAM Look Up Table. This

Enables hard and soft clipping tables to be loaded into the RAM.

The legaliser section has a switch that either selects the fully bypassed input signal, or the "Clipped" or "Legalised" signal. Any signal that is within the specified RGB Legal parameters will pass through the unit transparently. When the unit senses that it is in an "Illegal" part of the signal, it will switch in its processing to output the Clipped (Modified) part of the signal.

The Overshoot and undershoot suppression is employed here. This basically will correct for very fast (Non aliased) edges. These edges will cause the signal, when passed through a 601 Filter to overshoot and undershoot. The "Over-Kill" System predicts these overshoots and undershoots and will "Soften out" ONLY the fast edges that may cause the luminance signal to go outside the legally defined specifications. (As defined by the Low and High Clip Menus). This actually as well as keeping the signal legal also can enhance the look of poorly aliased graphics.

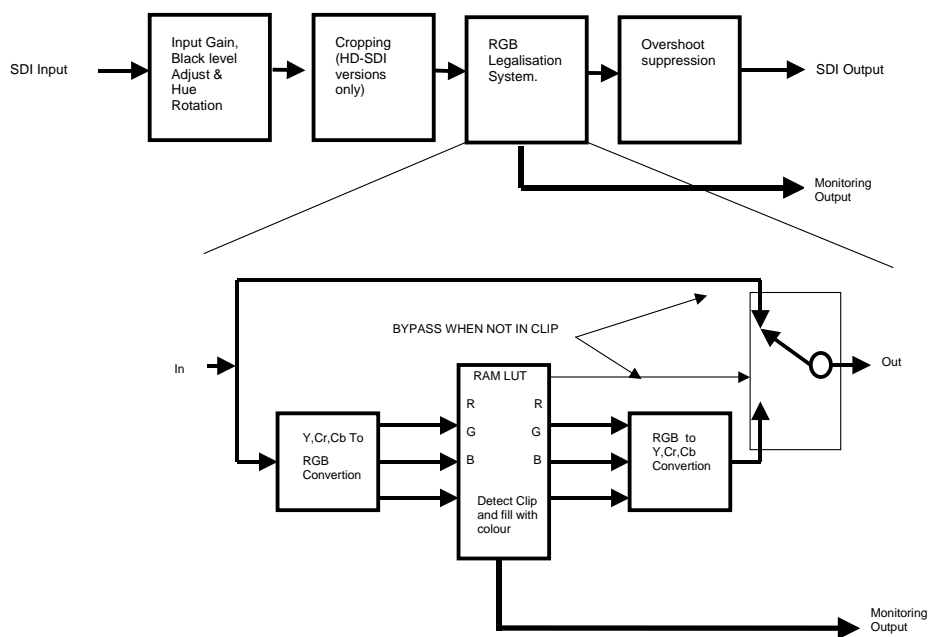


Figure 1-1 Legaliser Block Diagram.

## 1.2 Associated Equipment for the OL\_2HD

The OL\_2HD is a module and requires both a chassis and a control surface to function. In it's simplest form and system would consist of :-

- 1 off OL\_2HD Modules
- 1 off MX-9 maxiBox
- off FP-9 flexiPanel

### 1.2.1 Chassis

There are two 1RU chassis available:-

- The most cost effective one is called the maxiBox MX-9, this can hold up to 3 OL\_2HD processing modules.

- The flexiBox FB-9 has optional dual redundant power supplies and allows user replacement of modules, this can also hold up to 3 OL\_2HD processing modules.

## 1.2.2 Control Equipment for the OL\_2HD

There are two options available for controlling the OL\_2HD. The available modules are:-

- A 1RU control surface that fits on the front of a maxiBox or flexiBox. This is called a flexiPanel (Order code FP-9) and provides access to the control and configuration menus as detailed in section 3.
- A desk mounting control surface (Order code FP-10). This is a 4RU version of the FP-9 above designed to be desk mounted and is functionally compatible with the FP-9 control panel.



Figure 1-2 flexiPanel (FP-9)



Figure 1-3 deskPanel (FP-10)

# 2 Installation

## 2.1 Installation of the OL\_2HD product

The unit can be installed in a spare slot by a user in a flexiBox (FB-9) or by Eyeheight in a maxiBox (MX-9) with an associated FP-9 or FP-10 for control.

The FP-9 and FP-10 can be used to control the OL\_2HD remotely. Where as the FP-9 can also be mounted on the front of the FB-9/MX-9.

For detailed information on connecting remote panels refer to the section “Connection of Remote Panels to a flexiBox” in the geNETics Hardware Installation Guide.

A diagram of the OL\_2HD I/O connector is shown below.

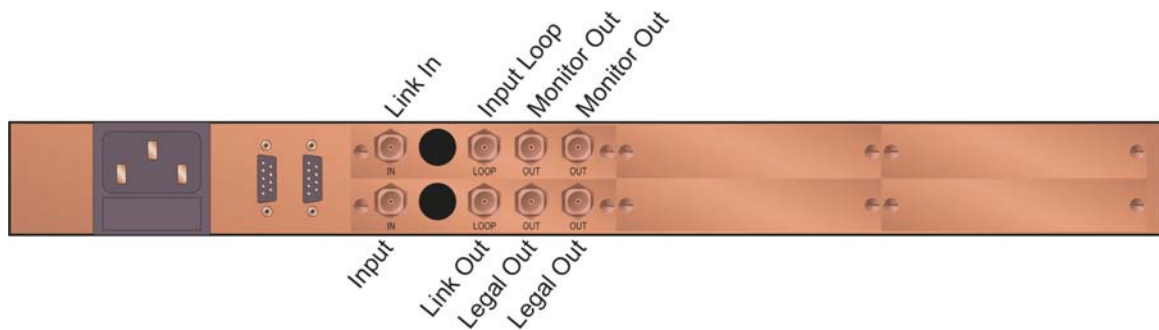


Figure 2-1 OL\_2HD Connections

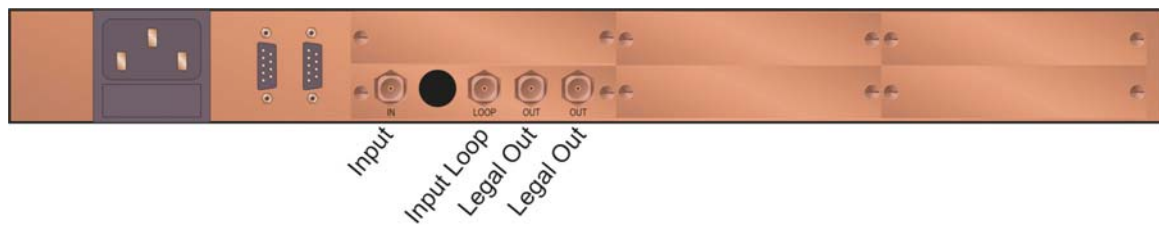


Figure 2-2 OL\_2AHD Connections

Input and Output connectors are BNC's.

# 3 Operation

## 3.1 Manual control of the OL-2HD

The OL-2HD is controlled using a set of MENUS. Each of these menu contains up to 3 parameters that are adjusted using the rotary digipots. The Menus define all of the adjustable operational parameters in the OL-2HD.

See chapter 3 Control Panel Operation for details of the control panel operation.

See section 3 of this chapter for the full list of menus.

## 3.2 Automation Control of the OL-2HD

Automation of the Genetics products is achieved either via the RS232 port (currently not implemented) or via the I-Bus Port using an optional DG-9 (RS232 to I-Bus dongle). Automation control of the OL-2HD is performed using the geNETics Automation Protocol.

Genetics protocol is described in detail in the “geNETics User Guide” section titled “Automation Protocol on the geNETics Platform”. The menu list in section 3 of this chapter contains the data information for the protocol.

Please refer to the “User guide for the DG-9 eyeheight dongle and set-up software.

## 3.3 Operational Menus for the OL-2HD

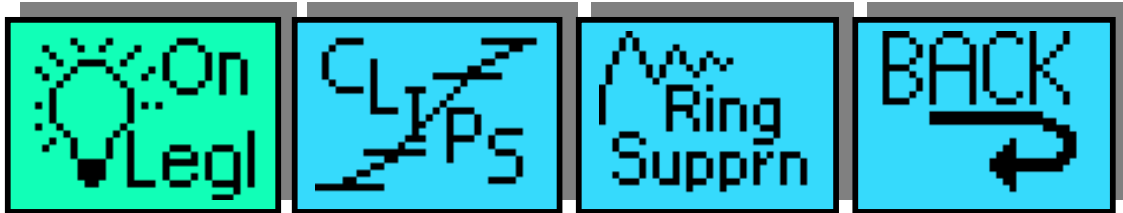
### Menu 00-03: Top Level Menus



Menu Num.	Heading	Automation	Function
00	System ON or OFF	Off On [0→1]	This will switch in and out the system as a whole, effectively putting it into bypass mode.

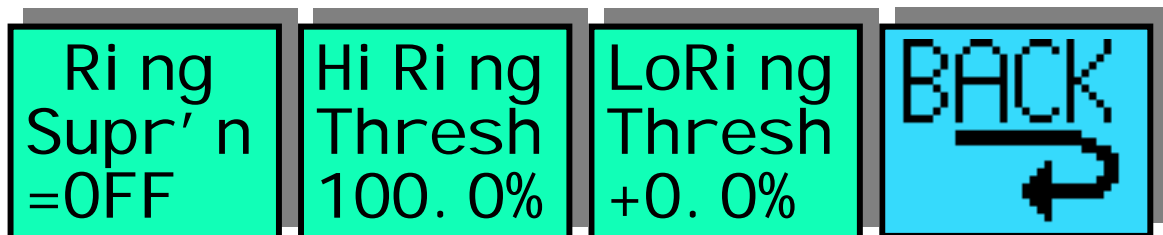
01	PICTURE	none	Go To the main Picture menus (24-27)
02	LEGALISE	none	Go To the main Legaliser menus (4-7)
03	UTILITIES	none	Go To the main Utility menus (36-39)

### Menu 04-07: Legaliser Menus



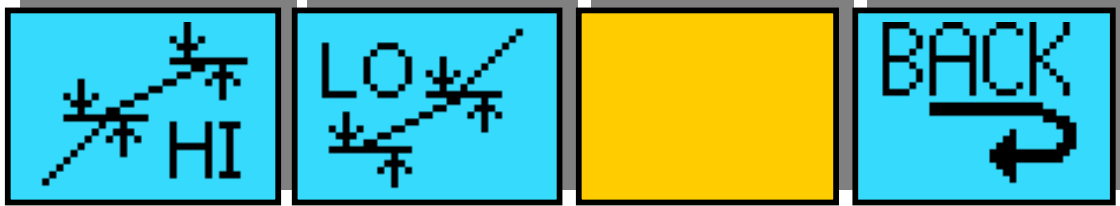
Menu Num.	Heading	Automation	Function
04	Legaliser Status.	On Off [0→1]	This shows the status of the Legaliser block only. (NOT the Proc amp (Input Gain) or the Overshoot suppression. On=ON, Legaliser is active Off=OFF, Legaliser is in Bypass
05	CLIPS	none	Go To the Hi and Lo Clipping menus (12-15)
06	RING	none	Go To the Ring Suppression menus (8-11)
07	BACK	none	Go To the main menus (0-4)

### Menu 08-11: Ring control menus



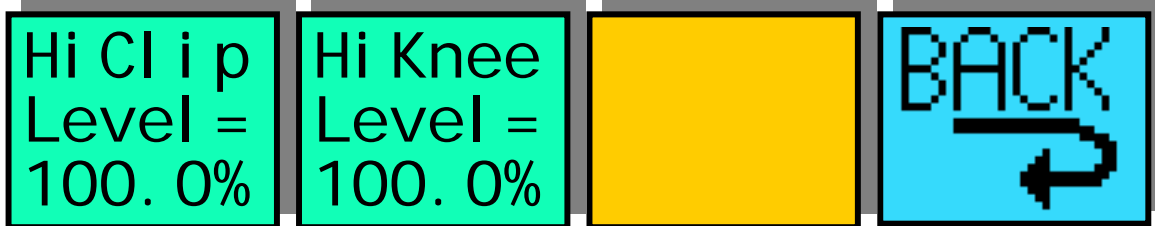
Menu Num.	Heading	Automation	Function
08	Ring Suppression Mode	Off Auto Manual [0→2]	Off= No overshoot or undershoot suppression is employed Auto= The Overshoot and Undershoot suppresser automatically tracks the Settings for the High and Low clip on the Legaliser section. Manual= The user can set the High and low Ring suppression thresholds manually.
09	High Ring Suppression Threshold	51% → 109% [512→1023]	When "Ring Suppression" Mode is in "Manual". This menu allows the user to set the upper limit at which no luma signal can go beyond, whether this is due to its absolute level, or its achievable level as an overshoot or undershoot on a 601 filter.
10	Low Ring Suppression Threshold	-8% → 50% [0→511]	When "Ring Suppression" Mode is in "Manual". This menu allows the user to set the lower limit at which no luma signal can go below, whether this is due to its absolute level, or its achievable level as an overshoot or undershoot on a 601 filter.
11	BACK	none	Go To the Legaliser menus (4-7)

### Menu 12-15: Legaliser Clip and Knee Menus



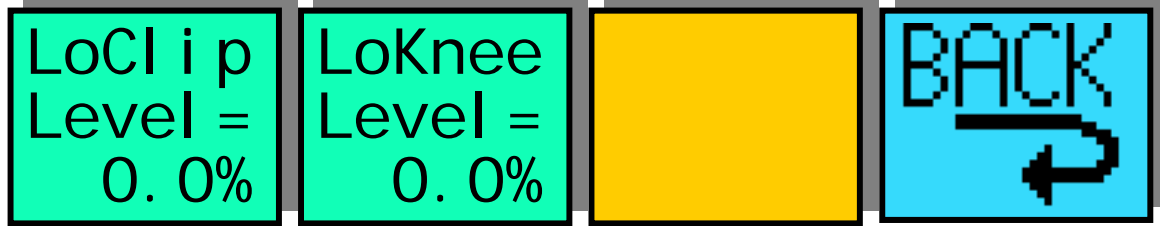
Menu Num.	Heading	Automation	Function
12	Hi	none	Go To the Hi Clip and Hi Knee Clipping menus (16-19)
13	Lo	none	Go To the Lo Clip and Lo Knee Clipping menus (20-23)
14		none	Blank
15	BACK	none	Go To the main menus (4-7)

### Menus 16-19: Legaliser High Clip and Knee settings



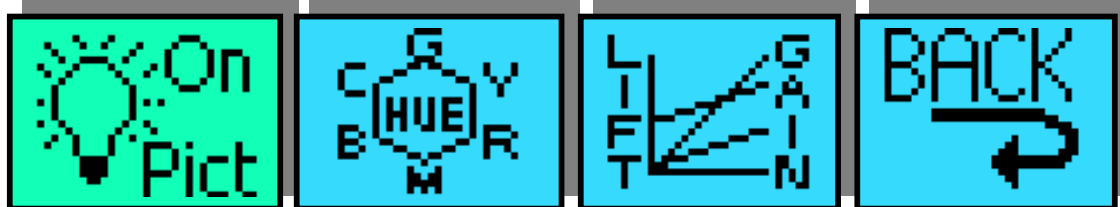
Menu Num.	Heading	Automation	Function
16	High Clip Level	51% → 109% [512→1023]	This indicates the High Clip point for the RGB Clipping. This is normally set to 100% for clipping at 0.7V in the analogue domain.
17	High Knee Level	51% → 109% [512→1023]	This indicates the High Knee point for the RGB Clipping. This can be set to give a “soft clip” from this knee point to the hard clip point.
18		none	Blank
19	BACK	none	Go To the main menus (12-15)

### Menu 20-23: Legaliser Low Clip and Knee Settings



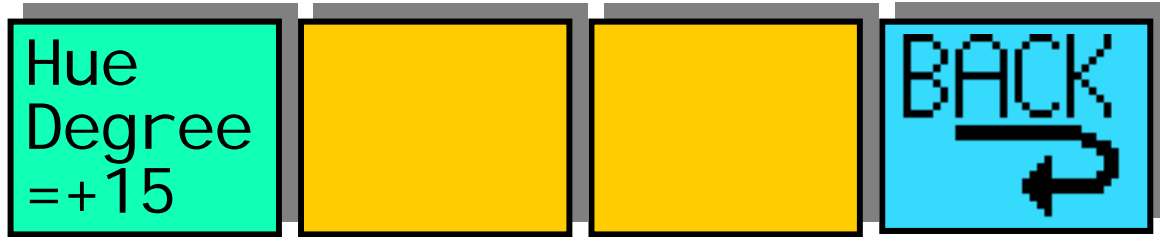
Menu Num.	Heading	Automation	Function
20	Low Clip Level	-7%→ 50% [1→511]	This indicates the Low Clip point for the RGB Clipping. This is normally set to 0% for clipping at 0V in the analogue domain.
21	Low Knee Level	-7%→ 50% [1→511]	This indicates the Low Knee point for the RGB Clipping. This can be set to give a “soft clip” from this knee point to the Low clip point.
22		none	Blank
23	BACK	none	Go To the main menus (12-15)

### Menu 24-27: Processing Amplifier Menus



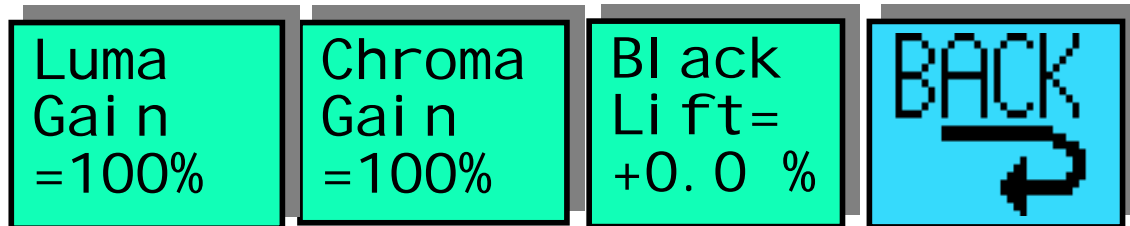
Menu Num.	Heading	Automation	Function
24	Lift, Gain, Hue and Black Control	On Off [0→1]	Active=Proc amp is processing, gain, hue and black controls are active Bypass= Unity Gain and no black offset.
25	HUE	none	Go To the Hue menus (28-31)
26	LIFT/GAIN	none	Go To the Luma, Chroma and Black menus (32-35)
27	BACK	none	Go To the main menus (0-4)

**Menu 28-31: Hue Control**



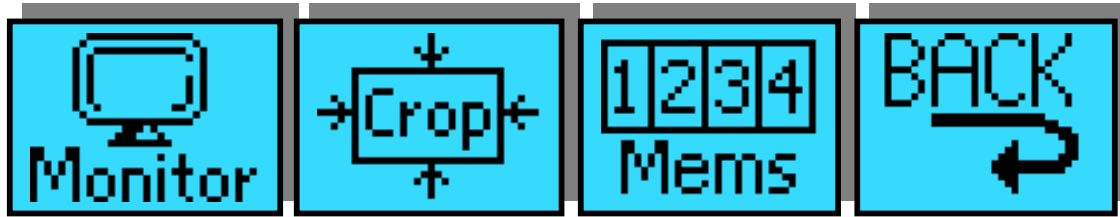
Menu Num.	Heading	Automation	Function
28	Hue	-180 to +180 degrees [-511 → +512]	Hue Rotation value, in degees.
29		none	Blank
30		none	Blank
31	BACK	none	Go To the Picture menus (24-27)

**Menus 32-35: Processing amplifier status.**



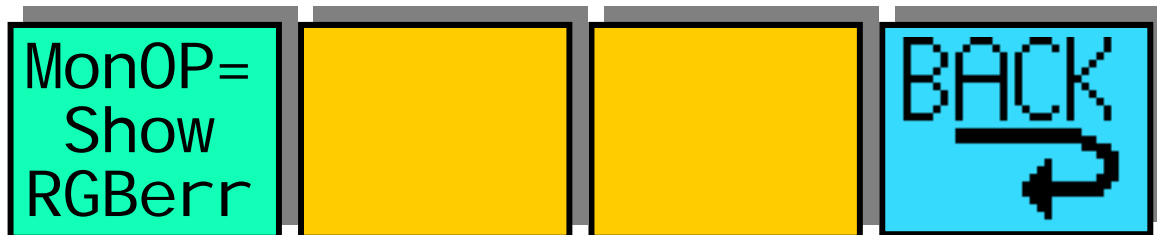
Menu Num.	Heading	Automation	Function
32	Luma Gain	0→200% [0→511]	Luminance Gain Adjustment
33	Chroma Gain	0→200% [0→511]	Chrominance Gain Adjustment
34	Black Level	+/- 20% Range [-255→255]	Black level adjustment
35	BACK	none	Go To the Picture menus (24-27)

### Menus 36-39: Utility Menus



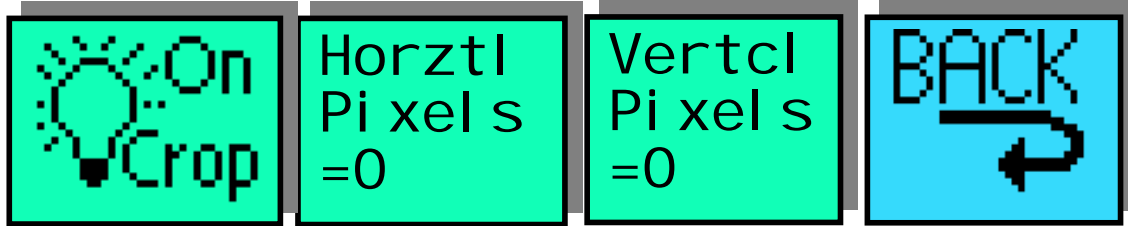
Menu Num.	Heading	Automation	Function
36	MONITOR	none	Go To the Out of Gamut Colour menus (40-43)
37	CROP	none	Go To the Crop menus (44-47)
38	MEMS	none	Go To the Memory and Software menus (48-71)
39	BACK	none	Go To the main menus (0-4)

### Menus 40-43: Out of Gamut Colour



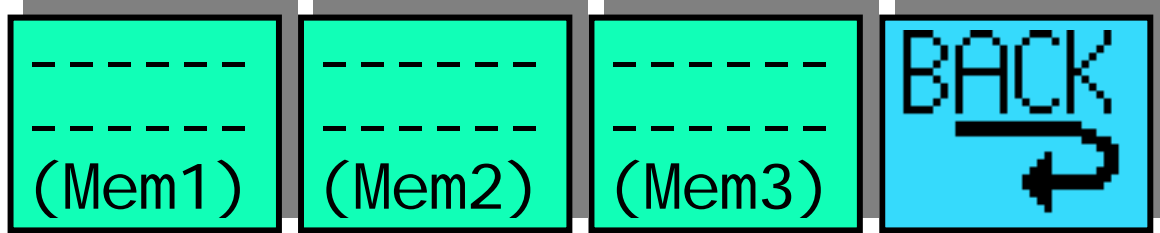
Menu Num.	Heading	Automation	Function
40	Out of Gamut Colour (Has no effect on OL-1)	ShowRGBerr BlueSteady RedSteady GreenSteady WhiteSteady FlashRGBerr BlueFlash RedFlash GreenFlash WhiteFlash LegalOut RawOut [0→11]	This is the colour used to fill in the illegal parts of the picture on the indicate output. RGB Mode will individually indicate the Red, Green and Blue parts of the signal that are modified by the legaliser using a corresponding fill colour. N.B. This menu only has effect on the OL-2HD.
41		none	Blank
42		none	Blank
43	BACK	none	Go To the Utils menus (36-39)

## Menus 44-47: Crop Settings



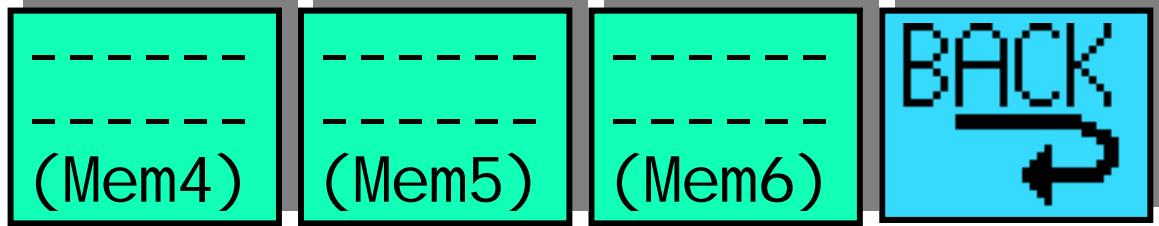
Menu Num.	Heading	Automation	Function
44	CROP	On Off [0→1]	Active=Element Cage is processing Picture will be cropped according to the Horizontal and Vertical Pixel settings
45	HORIZONTAL PIXELS	0→960 [0→960]	Left and Right crop
46	VERTICAL PIXELS	0→540 [0→540]	Top and Bottom crop
47	BACK	none	Go To the Utils menus (36-39)

## Menus 48–51: Memory Controls



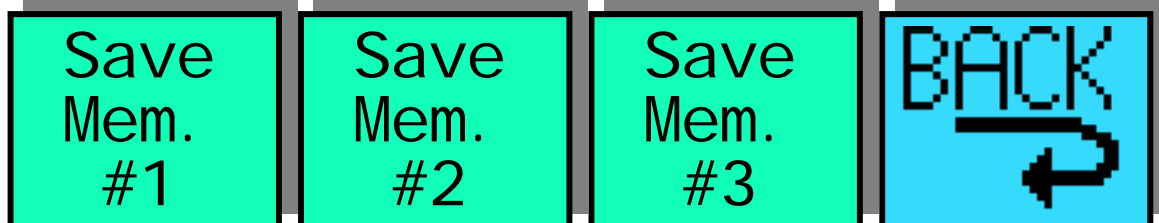
Menu Num.	Heading	Automation	Function
48	MEM1	1=Recall (Variable 1)	Pressing this will recall Memory number 1. User Names can be programmed in to the memories using a keyboard. See "geNETics User guide", section "Giving product Memories names"
49	MEM2	1=Recall (Variable 1)	Pressing this will recall Memory number 2.
50	MEM3	1=Recall (Variable 1)	Pressing this will recall Memory number 3.
51	BACK	none	Go To the Utils menus (36-39)

### Menus 52-53: Memory Controls



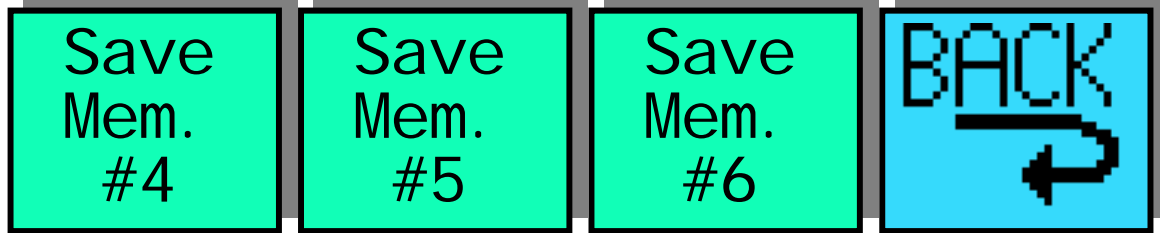
Menu Num.	Heading	Automation	Function
52	MEM4	1=Recall (Variable 1)	Pressing this will recall Memory number 4.
53	MEM5	1=Recall (Variable 1)	Pressing this will recall Memory number 5.
54	MEM6	1=Recall (Variable 1)	Pressing this will recall Memory number 6.
55	BACK	none	Go To the Utils menus (36-39)

### Menu 56-59: Memory Controls



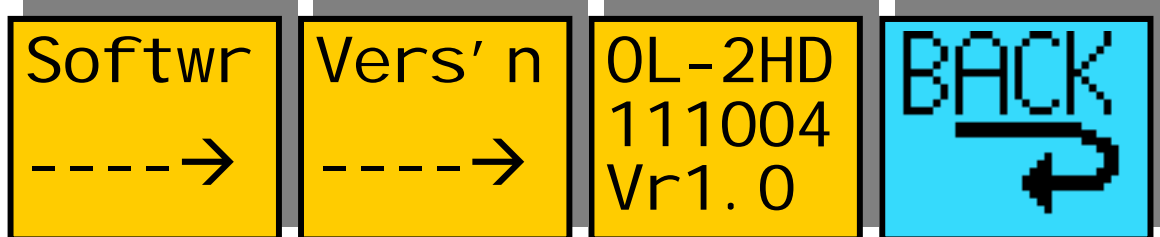
Menu Num.	Heading	Automation	Function
56	Save Mem. #1	1= Save	Pressing this will Save Memory number 1.
57	Save Mem. #	1= Save	Pressing this will Save Memory number 2.
58	Save Mem. #3	1= Save	Pressing this will Save Memory number 3.
59	BACK	none	Go To the Utils menus (36-39)

### Menu 60-63: Memory Controls



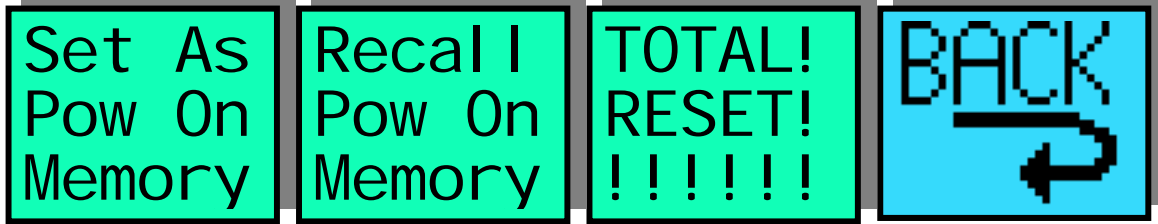
Menu Num.	Heading	Automation	Function
60	Save Mem. #5	1= Save	Pressing this will Save Memory number 4.
61	Save Mem. #6	1= Save	Pressing this will Save Memory number 5.
62	Save Mem. #7	1= Save	Pressing this will Save Memory number 6.
63	BACK	none	Go To the Utils menus (36-39)

### Menu 64-67: Software Version



Menu Num.	Heading	Automation	Function
64		none	Blank
65		none	Blank
66	Software Version	N/A	Shows the current software version
67	BACK	none	Go To the Utils menus (36-39)

**Menu 68-71: Power-on & Reset Controls**



Menu Num.	Heading	Automation	Function
68	Set As Pow On Memory	1=save	Pressing this will save the current set up as the power on default.
69	Recall Pow On Memory	1=Recall	Pressing this will recall the power on default settings.
70	TOTAL RESET	1=Reset	Pressing this will reset the system.
71	BACK	none	Go To the Utils menus (36-39)