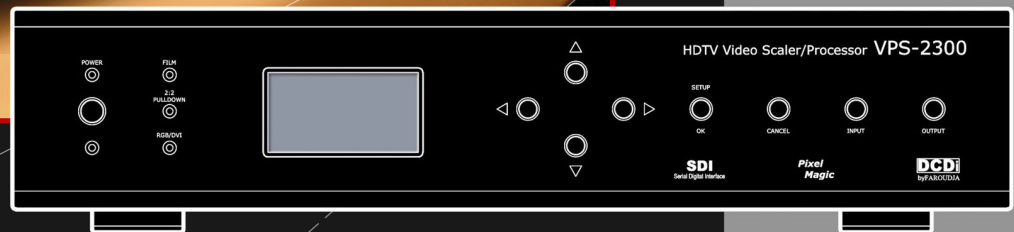
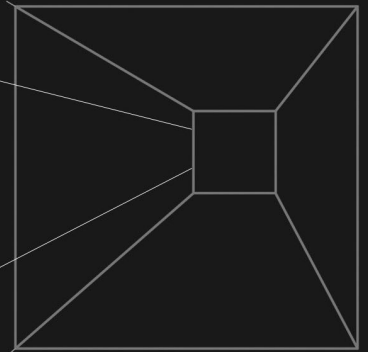


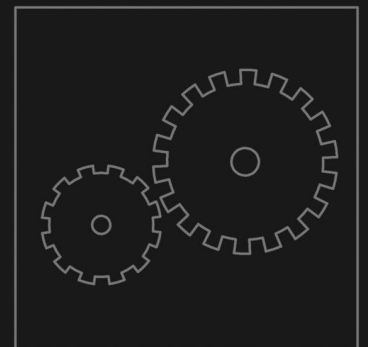
crystalio®

HDTV Video Scaler / Processor VPS-2300



Over the years, Pixel Magic Systems Ltd. has devoted itself to the creation of a modular, expandable and network ready video processing solution using the best of breed components, with a view to delivering a cinema-class visual experience at an affordable price level.

We are glad to have achieved this with *Crystalio*, the video processor of excellence.



USER GUIDE

 **PIXEL MAGIC™**

WARNING

- TO PREVENT FIRE OR SHOCK HAZARD, DO NOT USE THIS PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.
- TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.
- TO PREVENT ELECTRICAL SHOCK, MATCH WIDE BLADE PLUG TO WIDE SLOT FULLY INSERT.



This lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**

Warning: To reduce the risk of electric shock, do not remove cover (or back) no user-serviceable parts inside. Refer servicing to qualified service personnel.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at the plugs, convenience receptacles, and at the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug the apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

This appliance shall not be exposed to dripping or splashing water and that no object filled with liquids such as vases shall be placed on apparatus.

Welcome

Thank you for purchasing *Crystalio*, the next generation of video processors! This unit will bring you a breathtaking visual experience by exploiting the utmost capability of your display devices.

Before we start, let us first check that you have all of the following contents with you:

1. *Crystalio* VPS-2300 Video Processor
2. Remote Control
3. Mains power lead
4. Pixel Magic DVD
5. *Crystalio* User Guide
6. *Crystalio* Installation & Setup Quick Guide
7. USB Firmware upgrade thumb disk
8. Rack mounting brackets

If any items are missing, please contact your *Crystalio* retailer immediately.

If everything is ready, you may now:

- 1 Connect your *Crystalio* to your AV devices with reference to the section 3, Hardware Installation.
- 2 Configure your *Crystalio* with reference to section 4, System Setup, and section 5, Expert Configuration.
- 3 Register your *Crystalio* to enjoy official warranty, technical support, and software update from Pixel Magic Systems Ltd.
- 4 Upgrade your *Crystalio* with the USB Firmware upgrade thumb disk as provided. Also check *Crystalio*'s website (<http://www.crystalio.com>) regularly to download the latest firmware.

Enjoy!

!!Caution: Make sure you read and follow the instructions of the *Crystalio* User Guide or Installation & Setup Quick Guide to connect the *Crystalio* to your AV system.

Welcome	3
Contents	4
1. About Crystalio	5
1.1 Why do I need <i>Crystalio</i> ?	5
1.2 Video Processing History	5
1.3 Video Processing Technology Primer	6
2 Familiarizing with Crystalio	8
2.1 <i>Crystalio</i> Front Panel.....	8
2.2 <i>Crystalio</i> Rear Panel	9
2.3 Remote Control.....	11
3 Hardware Installation	12
3.1 Compatible Equipment.....	12
3.2 Mains.....	12
3.3 Video Inputs.....	12
3.4 Video Outputs	13
3.5 Product Registration.....	13
4 Basic Software Setup	14
4.1 Configure Your Video Source	14
4.2 Switch on <i>Crystalio</i>	14
4.3 Select Input Terminal	14
4.4 Select Output Terminal.....	15
4.5 Set Output Format / Resolution	15
5 Expert Configuration	16
5.1 Overview.....	16
5.2 Input Select.....	17
5.3 Aspect Ratio	17
5.4 Video Settings.....	18
5.5 Advanced.....	19
5.6 System Config.....	24
5.7 AR Profile	30
5.8 Video Profile	31
5.9 Pixel Magic System.....	32
6 Troubleshooting	33
7 Specifications	34
8 Safety Information	35
9 Support and Warranty Information	36

1 About Crystalio

Crystalio is the realization of a dream long held by many engineers and product designers but accomplished by few. Over the years, Pixel Magic Systems Ltd. has devoted itself to the creation of a modular, expandable and network ready video processing solution by adopting the best of breed components, with a passion to delivering a cinema-class video image performance at an affordable price level.

"We envisaged a product that would be powerful enough and configurable for the Videophile, while at the same time accessible to film enthusiasts who care about the picture, not the technology. More importantly, it should be so designed that integration with the new breed of 21st Century 'connected homes' could readily be accomplished. We take pleasure and pride to have achieved these goals with Crystalio."

1.1 – Why do I need Crystalio?

Crystalio is designed to deliver the best viewing experience from your video sources and video display device. This is made possible by the use of the award winning technology introduced by Faroudja®, inventor of the DCDi® technology which is widely used in a diverse range of domestic and professional AV components.

You may wonder why you need a separate video processor, if you can simply purchase a projector or a DVD player with DCDi® technology built in. The reason is performance and flexibility. *Crystalio* allows you to have the sophisticated control over every aspect of video processing, so that you can control the performance of the entire video system to a far greater extent. *Crystalio* also gives you the flexibility to enjoy this feature from many different types of source devices, from basic composite video sources right through to pure digital SDI and DVI video. SDI (Serial Digital Interface) is a specialist video distribution standard for video transmission in the broadcast industry at maximum quality over long distance by using inexpensive co-axial cable. While this is not available for domestic equipment, it is possible to purchase modified domestic equipment that is SDI enabled. DVI (Digital Video Interface) on the other hand is a technology used by the computer industry to connect digital displays (e.g. plasma panels, LCD monitors etc.) to PC video cards, and this is only suitable for relatively short distances of a few feet.

In a nutshell, *Crystalio* is able to maximize the performance of any video sources, from traditional SVHS recordings, video games consoles to high definition TV broadcast and DVD players.

The following will give you an in-depth evolution of the video processing history that has led to the innovation of *Crystalio*. You may skip these paragraphs and go directly to Section 1.3 for an overview of the most cutting-edge technologies that *Crystalio* has embodied.

1.2 – Video Processing History

Faroudja®'s technology began in the early 1970s when Yves Faroudja and a group of videophiles invented state-of-the-art video processing technologies and began licensing them to other companies. In the 1990s, Faroudja became involved in the specification of High-Definition TV (HDTV). This is a new television standard which is being introduced at different rates worldwide, and vastly improves the quality of the image that is displayed. How is this achieved? Well, simply by increasing the amount of picture detail used to make the image.

To put this into perspective, a standard definition (SDTV) image is made up of around ¼ million pixels or points of light. This sounds like an awful lot of information, more than it would ever be required to display a good quality TV image. However, when this standard was defined, the maximum screen sizes that could be used in a domestic environment were much smaller than those available today. Consider that a 50" screen has four times the area of a 25" display, with the increased use of projection systems meaning that 100" or even 200" screen sizes are commonplace (16 times of the visible area). Suddenly, ¼ million is not a lot of detail at all, and the result is any problems in the image are now magnified to such an extent that the viewing pleasure is reduced. The solution is to use more pixels to make up the image, and HD increases this by a factor of eight to 2 million. This makes a huge difference to the quality of the image, which has been likened to 'looking through a window' – it really is that good.

However, while the hardware industry has now started to produce affordable HD capable displays, the availability of source devices and programming to use with HD devices has been limited. The amount of HD programming material is miniscule compared to the availability of SD material, which means that if you simply connect your SD video source to your high quality display, you will often be very disappointed with the results.

reference information

1 About *Crystalio*

From SD to HD

Engineers at Faroudja realized that to find an entry point for the new HD programming into a broadcasting industry where HD programmes were yet to be available, they had to develop a device capable of 'up-conversion', i.e. increasing the detail of the then existing SD material into HD format. This of course was a highly complex task to achieve. To convert a ¼ million pixel SD image into a 2 million pixel HD image, the device should have a sophisticated programming to 'guess' the missing pixels in-between, which is essentially creating nearly 90% of the image information from the originally available 10%. Faroudja was successful in such ground breaking attempt. And in June 1998, Yves Faroudja won the Charles F. Jenkins Lifetime Achievement Award by the Academy of Television Arts and Sciences.

DCDi®

The equipment developed to achieve the SD to HD up-conversion for the broadcasters was of course way beyond the budget of the domestic film enthusiasts, but with the ever increasing power and sophistication of microprocessors, it was clear to Faroudja that this technology could eventually be made available to the domestic market. DCDi® (Directional Correlational Deinterlacing) to give it its complete title, pioneered affordable, high quality video processing for the first time in the domestic market.

DCDi® eliminates the jaggedness that conventional up-converters causes to diagonal edges in video. DCDi®'s unique algorithm identifies all the moving edges in a scene and adjusts the angle of interpolation at each pixel so that the interpolation always follows the edge instead of crossing it, eliminating stair-casing or jagged edge artifacts. This technology was first used in the Digital Format Converter introduced in 1997. With its combination of decoding, de-interlacing and enhancement technologies, they won an Emmy Award from the National Academy of Television Arts and Sciences in 2001. In addition to being used in all Faroudja Home Theatre and High Definition Broadcast products, the DCDi algorithm has been incorporated into a wide range of video sources and displays by different manufacturers, identifiable by its distinctive DCDi® logo on their front panels.

reference information

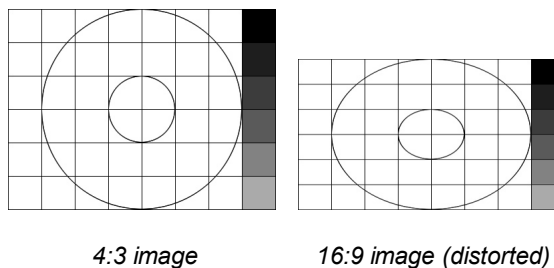
1.3 – Video Processing Technology Primer

Crystalio is the only video processor on the market that uses the latest Faroudja FL2300 DCDi® central processor, so quite simply if you want to enjoy the benefit of over 30 years of pioneering video excellence – *Crystalio* is your video processor of choice.

Listed below are some state-of-the-art video processing technologies that *Crystalio* offers to you:

Aspect Ratio Conversion

The aspect ratio of a video source describes the proportion of the image's width versus its height. Traditionally, programmes made for television have been made at a 4:3 aspect ratio (for every 3 units high the picture is 4 units wide), whereas films have used widescreen aspect ratios (16:9 or wider).



For the image to look correct (i.e. to prevent the image being distorted or stretched either vertically or horizontally), every part of the playback 'chain', i.e. the video source material, the video source and the display, must be correctly configured.

Aspect Ratio Conversion is used to fit images on displays with different aspect ratios while best preserving the correct aspect ratio of the image. NTSC and PAL contents including TV, VCR, Camcorder and video games, typically have an aspect ratio of 4:3.

NTSC and PAL contents can be shown on a 16:9 display using various forms of conversion, including Pillar Boxing, Zoom and Non-Linear, referred to as Anamorphic or Panoramic. Faroudja's technology varies aspect ratio and picture position to handle traditional 4:3 aspect ratio sources and the wider 16:9 HDTV aspect ratio on a variety of display types and video formats.

1 About Crystalio

TrueLife® Enhancement

Conventional video enhancement simply boosts up the high-frequency components of the video signal with a 'peaking filter'. This often leads to undesirable artifacts (or visible 'glitches'), which are distracting and ruining the viewing experience.

Faroudja, on the other hand, uses its TrueLife® Enhancement technology to identify patterns of transition that are the desired details in an image such as skin texture, freckles or hair. These areas of transition are deliberately enhanced to render the details more visible and more lifelike. At the same time, the technology enhances large edges to create greater depth of perception without introducing visible artifacts or distortion.

Film Mode Detection Technology

In 1989, Faroudja invented and patented film mode detection, also known as 3:2 pulldown detection.

Film-originated content (where conventional film cameras were used as opposed to digital video cameras) that has gone through 3:2 pulldown for conversion to NTSC (the United States television broadcast standard) is detected and the original film frames are recreated by blending the fields back together.

'Pull-down' is the process of translating film signals to tally with the broadcast standard. Again, such a process often results in artifacts commonly known as combs. Faroudja was the first to introduce "bad edit" detection capability to detect the original film frames within the video stream and reconstruct an accurate image. This produces an image free from motion artifacts with full vertical resolution. This film mode processing is widely accepted in the industry.

Cross Colour Suppression

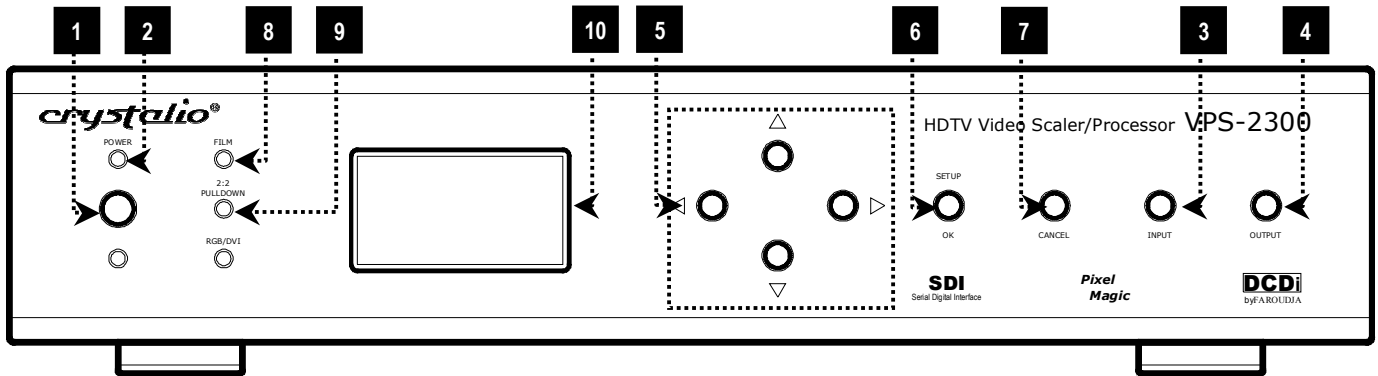
Cross colour is an artifact produced by imperfect decoding of composite video. High frequency luma (brightness) components are incorrectly decoded as chroma (colour) signals, causing colour effects to appear where there should be none. This problem can be detected in many types of "busy" scenes including tiled rooftops, herringbone patterned clothing and leafy scenery *etc.* The most common and visible cross colour artifacts are flickering, flashing colours or rainbow patterns. The artifact can be eliminated in still images, but is much more complex to detect and correct in moving images. Faroudja's Cross Colour Suppression uses motion detection to selectively perform the filtering in an intelligent manner, identifying where there is no motion in the image and using the already existing frame memory for the chroma storage required.

Motion Adaptive Noise Reduction

Noise in an image is typically eliminated or reduced by filtering. Filtering can be done spatially (1-D) or temporally (3-D). Spatial filtering results in a softer image with the details lost. Temporal filtering, without the problem of detail loss, would however induce smearing or ghosting of moving objects in the image if not accurately performed. Faroudja employs Motion Adaptive processing to reduce noise without causing smearing.

2 Familiarizing with *Crystalio*

2.1 – *Crystalio* Front Panel



1 POWER button

Press once to switch on, press once again to switch to standby.

The status is shown by the Power Indicator LED.

!!Caution: Before connecting *Crystalio* to the power supply, check the voltage switch at the rear panel to make sure the correct voltage is selected.

!!Caution: When *Crystalio* is switched off, please wait for at least 10 seconds before switching it on again.

2 POWER indicator LED

Green - *Crystalio* is running

Red - *Crystalio* is in standby mode

3 INPUT button

Press to cycle through the *Crystalio* video input sources.

Input sources support HDTV Component, HDTV DVI, SDI, S-Video and RGBs etc. Please refer to Section 5.2, Input Select, for details.

4 OUTPUT button

Press to cycle through the *Crystalio* output modes: <RGBHV>, <RGBs>, <DVI>, <YpbPr>, & <YcbCr>

5 Navigation buttons

6 SETUP / OK button

7 CANCEL button

8 RGB indicator LED

ON - analogue video output in RGB mode

OFF - analogue video output in Component Y-Pb-Pr mode

9 FILM & 2:2 PULLDOWN indicator LEDs

Film	2:2 Pulldown	Mode
OFF	OFF	Video (DCDi)
ON	OFF	Film (3:2 Pulldown)
ON	ON	Film (2:2 Pulldown)
OFF	ON	Not applicable

10 LCD Display

The LCD display has 2 distinct modes.

Status Display

By default, the LCD displays the current status of *Crystalio* which includes the following information:

- Video input source
- Video source format
- Screen aspect ratio
- Output resolution / format
- Image aspect ratio
- Image size
- Output selection
- Current de-interlacing mode

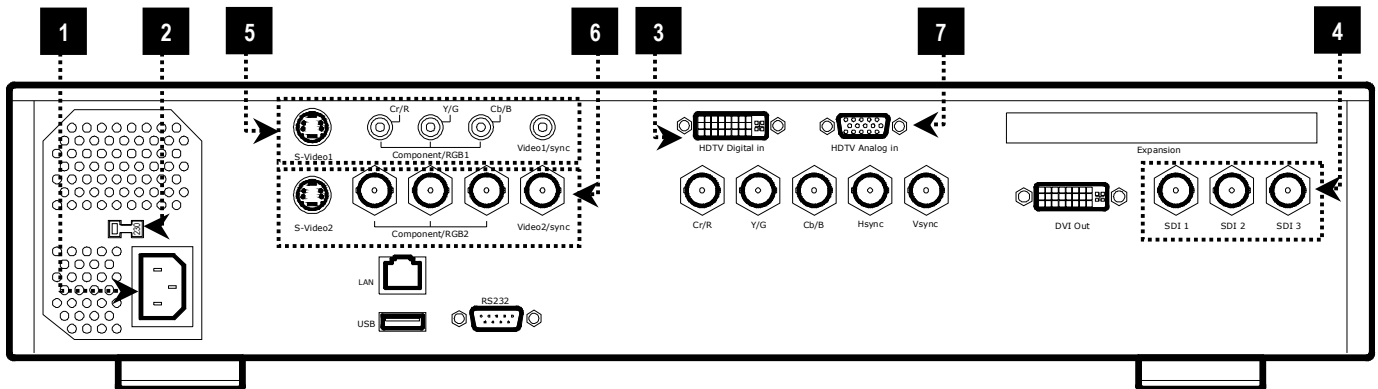
Setup Display

When setting up *Crystalio*, the LCD displays setup menu. Typical operation includes:

- To enter menu set up mode, press <SETUP>
- To highlight the previous or next item, press <UP> or <DOWN>
- To increase or decrease value, press <LEFT> or <RIGHT>
- To select an item or confirm setting, press <OK>
- To exit and go up one level of the menu, press <CANCEL>

2 Familiarizing with *Crystalio*

2.2 – *Crystalio* Rear Panel



POWER

1 Power Supply Cable Entry

Use the cable supplied with your *Crystalio*.

2 Power Supply Voltage Selector

This must be set to the same as your mains voltage, either 110v or 220v AC. It should have been set correctly by your supplying dealer.

!!Caution: Make sure this is correctly set **BEFORE** connecting *Crystalio* to your power supply.

VIDEO INPUT TERMINALS

These allow you to connect your video sources to *Crystalio*. Please refer to Section 3.3 for details.

Digital

3 HDTV Digital In

4 SDI 1, SDI 2, and SDI 3

Analogue

5 Component/RGB 1

Can be used either as:

- RGBs (RGB with composite sync) or RGsB (RGB with Sync on Green)
- Component Video Y-Pb-Pr
- 1 x Composite (CVBS) video and 1 x S-Video

6 Component/RGB 2

Can be used either as:

- RGBs (RGB with composite sync) or RGsB (RGB with Sync on Green)
- Component Video Y-Pb-Pr
- 1 x Composite (CVBS) Video and 1 x S-Video

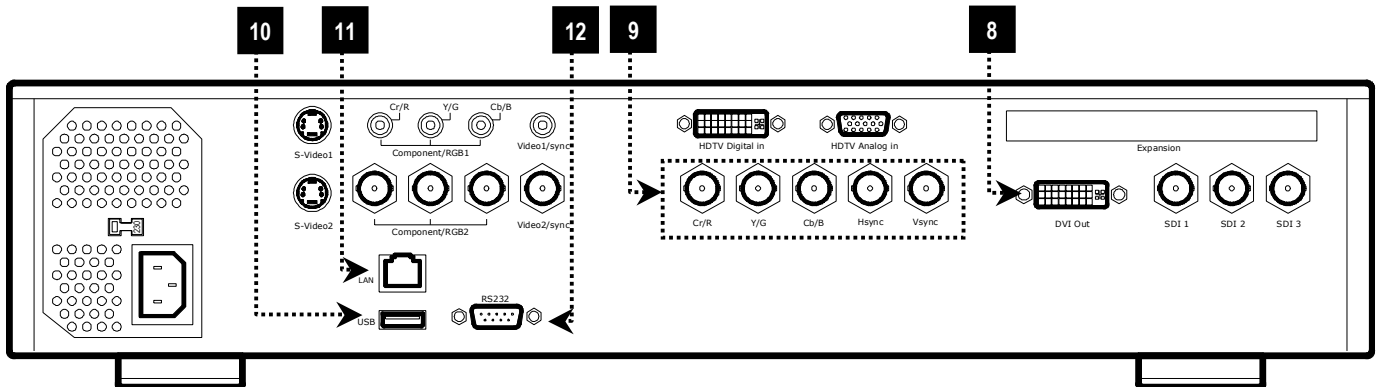
7 HDTV analogue in

Can be used either as:

- High Definition Component Video Y-Pb-Pr
- RGBHV
- RGsB (RGB with Sync on Green)

2 Familiarizing with *Crystalio*

2.2 – *Crystalio* Rear Panel (cont'd)



VIDEO OUTPUT TERMINALS

Your display device(s) should be connected to these terminals. *Crystalio* offers the following connection configurations.

Digital

8 DVI

The DVI (Digital Video Interface) provides the best quality video output from *Crystalio*. If you are connecting to a display device that has a DVI terminal, this is the recommended option to use. This allows direct transmission of the video information from *Crystalio* to the display without any conversion from digital to analogue signals.

Analogue

9 5 x BNC Connectors

Can be used either as:

- RGBHV
- RGB(Cs)
- Component Video Y-Pb-Pr or Y-Cb-Cr

Computer / Network Connectivity

These are optional / advanced connections

10 USB (Universal Serial Bus)

Allows *Crystalio* to be upgraded using USB thumb disk.

11 RJ45 Ethernet connection

Allows *Crystalio* to be connected to a computer network for firmware upgrades.

RS232 DB9 Male Serial connection

Allows *Crystalio* to be integrated into and controlled by home theatre control systems.

2 Familiarizing with Crystalio

2.3 – Remote Control

A remote control is supplied with your *Crystalio* for your direct access to the commonly used functions.

Note: Insert batteries to remote control before using.

1 Power ON & OFF buttons

Press ON to switch your *Crystalio* on and press OFF to switch to standby mode.

!!Caution: When *Crystalio* is switched off, please wait for at least 10 seconds before switching it on again.

2 Video Settings buttons

Use these buttons to configure the appearance of the video being displayed. Parameters available for customization including BRIGHTness, CONTRAST, COLOR saturation, RGB OFFSET, RGB GAIN, and HUE. Refer to Section 5.4 for details.

3 Aspect Ratio buttons

To switch to the common aspect ratio settings directly including 4:3, 16:9, 2.35:1, and SCREEN. Refer to Section 5.3 for details.

4 Input Select buttons

To select the active video source directly including SDI 1, Video, Component, and DVI etc. Refer to Section 5.2 for details.

5 Navigation buttons

6 ENTER button

ENTER button acts the same as the SETUP / OK button on the front panel. It is used to enter the menu setup mode and to select item or confirm setting.

7 ESC button

ESCAPE button acts the same as the CANCEL button on the front panel. It is used to exit and go back one level of the menu setup

8 LCD ON / LCD ACTIVE / LCD OFF buttons

To control the backlight of LCD display on the front panel. Refer to Section 5.5 for details.

9 AR STORE PROFILE button

Use this to memorize Aspect Ratio profiles.

10 AR PROFILE buttons

To recall stored Aspect Ratio profiles. Refer to Section 5.7 for details.

11 USER STORE PROFILE button

To store user-defined video profiles.

12 VIDEO USER PROFILE buttons

To recall stored user profiles. Refer to Section 5.8 for details.

13 POSITION CUSTOM CENTRE

Use this together with the Navigation buttons to control the position of displayed image. Refer to Section 5.5 for details.

14 LED ACTIVE / LED OFF buttons

To switch on and off the LED indicators on the front panel.

15 PIXEL MAGIC 1:1 button

To activate Pixel Magic System. Refer to Section 5.9 for details.

16 ZOOM buttons

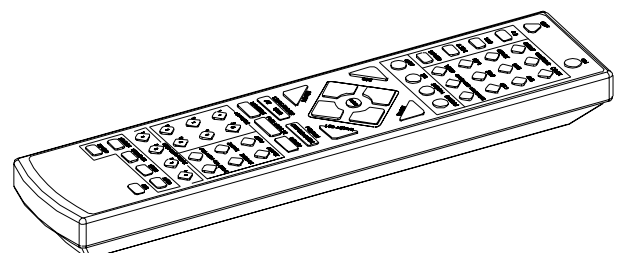
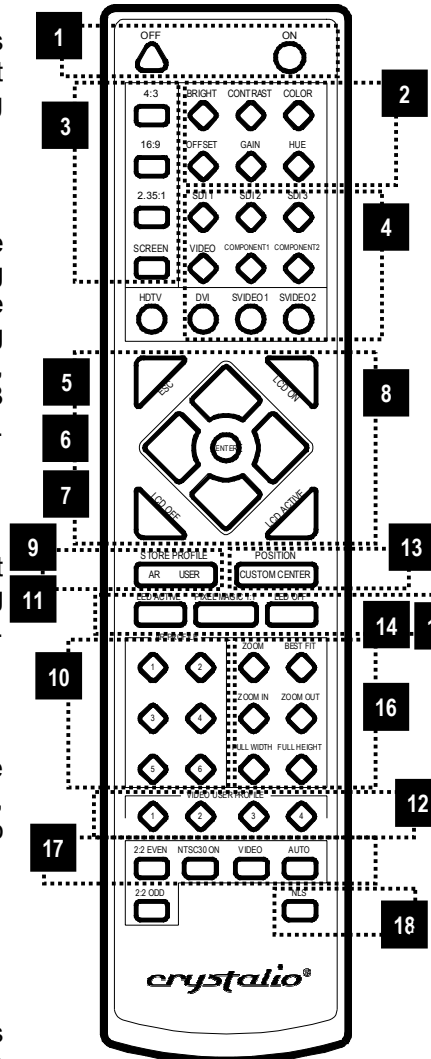
To scale displayed image so that it makes the image perfectly fit the display device. These include ZOOM, BEST FIT, ZOOM IN, ZOOM OUT, FULL WIDTH, & FULL HEIGHT. Refer to Section 5.5 for details.

17 Deinterlace buttons

Use these to select deinterlace method including AUTO, VIDEO, NTSC@30 ON, 2:2 EVEN, and 2:2 ODD. Refer to Section 5.5 for details.

18 NLS button

Use this to switch on and off Non-Linear Stretching. Refer to Section 5.5 for details.



3 Hardware Installation

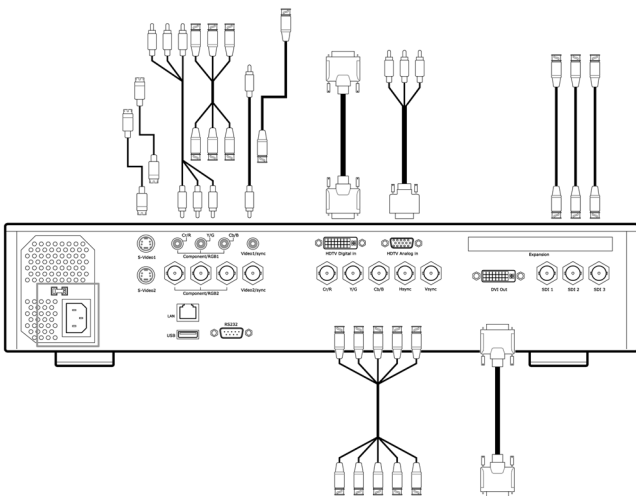
3.1 – Compatible Equipment

In simple terms, *Crystalio* serves as a video processor which enhances video signal from **source** devices and then deliver the enhanced video signal to the **display** devices.

Crystalio is compatible with:

Any source device capable of outputting:

- Composite Video
- S-Video
- RGsB (Sync on Green)
- RGBs (Separate Sync)
- Component (Y-Pb-Pr)
- VGA (HD15)
- Digital DVI
- SDI (Serial Digital Interface)



Any analogue or digital display device is capable to accept input in the form of:

- Analogue RGBHV
- Analogue RGB with composite sync
- Analogue Component (Y-Pb-Pr)
- Analogue Component (Y-Cb-Cr)
- Digital DVI

3.2 – Mains

!!Caution: Ensure that the voltage selector is set correctly for your mains voltage. If you have any doubts, DO NOT connect your *Crystalio* and contact your dealer for advice. Incorrect setting of the voltage selector will result in serious damage to your unit and may lead to fire hazard / electric shock.

!!Caution: Connect *Crystalio* to a power point using the mains cable provided.

3.3 – Video Inputs

Crystalio includes a comprehensive set of input terminals to allow you to connect a wide range of video sources.

For the best results you should:

- **use the highest quality output that your video source provides**
- **use high quality cables for all connections**

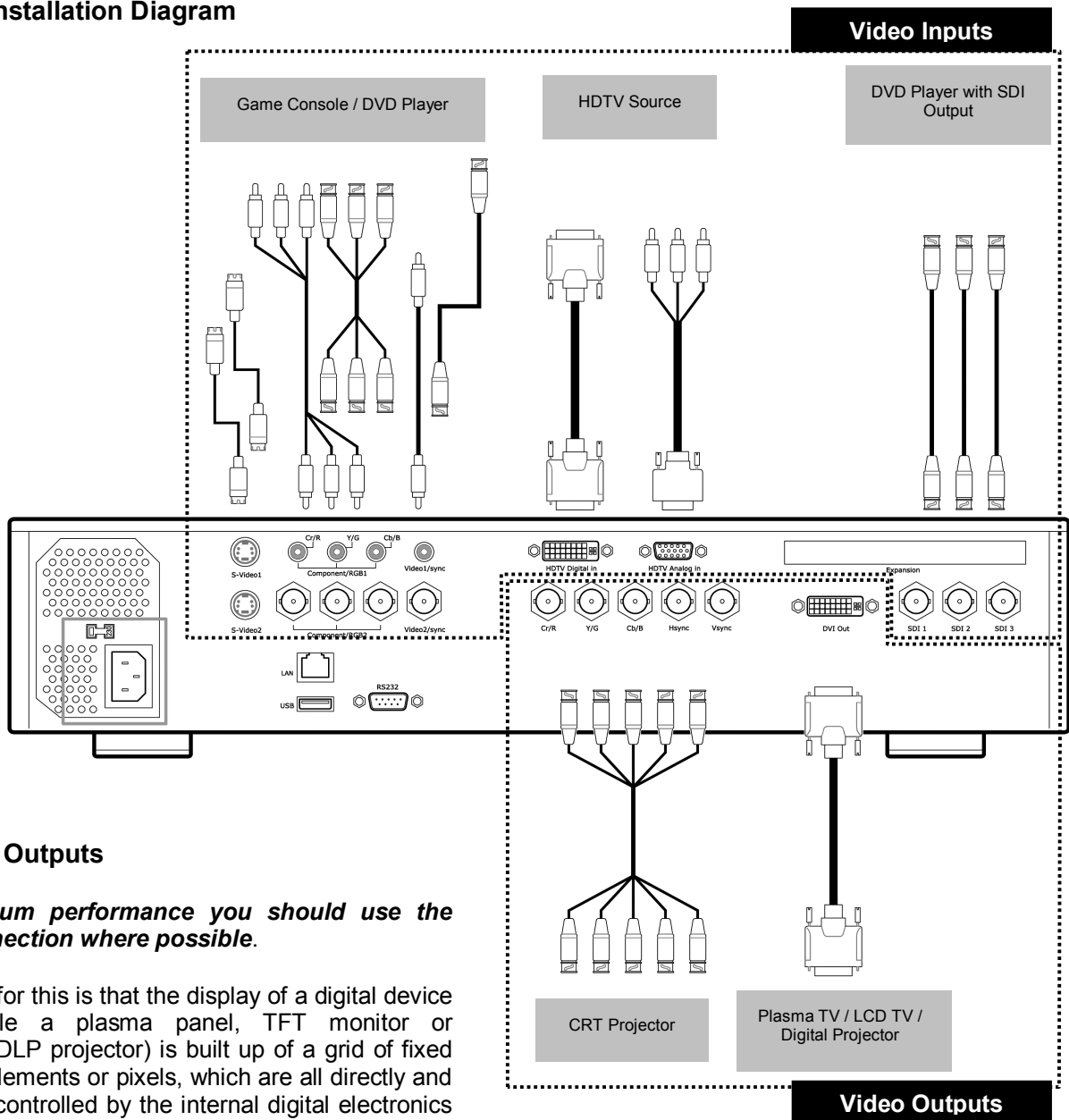
When deciding on which output to use from your device, use the following list as a guideline (with best quality being first):

- 1 SDI or DVI** (a direct digital connection from a compatible set top box or DVD player).
- 2 RGB** (RGsB/RGBS) – often available from set top boxes, DVD players etc., This could be used an optional connection on games consoles.
- 3 Component** (YpbPr) – typically available on mid-range to high-end DVD players and some games consoles.
- 4 S-Video** – a general purpose connection found on many devices. Sometimes (but incorrectly) this referred as SVHS.
- 5 Composite** – the most common, and the lowest performing video connection.

TIPS: It is recommended that you choose the interlaced output from your source device instead of the progressive (e.g. 480i instead of 480p). This leaves the conversion from interlaced video to progressive video to be performed by *Crystalio*, which has sophisticated processing dedicated to this task.

3 Hardware Installation

Hardware Installation Diagram



3.4 – Video Outputs

For maximum performance you should use the digital connection where possible.

The reason for this is that the display of a digital device (for example a plasma panel, TFT monitor or LCD/LCOS/DLP projector) is built up of a grid of fixed number of elements or pixels, which are all directly and individually controlled by the internal digital electronics of the display. Using the DVI interface of the display allows these individual pixels to be directly controlled by *Crystalio*, bypassing the internal picture processing electronics of the display device, and thereby producing more detailed and accurate images.

When deciding on which output to use from your device, use the following list as a guideline (best quality first):

- | | |
|---|--|
| 1 | DVI (a direct digital connection from <i>Crystalio</i> to the display device). |
| 2 | RGBHV / RGB(Cs) |
| 3 | Component video |

3.5 – Product Registration

To enjoy the 12-month warranty for your *Crystalio*, you must register online at:

<http://www.crystalio.com/support.html>

This would only take a couple of minutes. You will need your serial number so please make a note of it prior to registering your *Crystalio*.

Once registered, you will be entitled to view technical information, online product help, and of course software updates for your *Crystalio*.

4 Basic Software Setup

4.1– Configure Your Video Source

Even your video source has the option to output progressive video (denoted by a number and then the letter 'p', for example 480p), for maximum results, it is recommended to disable such option and select interlaced video mode instead (denoted by a number and then the letter 'i', for example 480i).

The reason for this is that *Crystalio* features the state-of-the-art technology specifically designed for converting interlaced video into progressive video, and that will usually deliver higher performance than the converter built in your source device.

4.3 – Switch On *Crystalio*

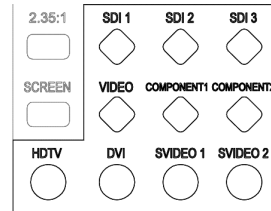
Press the POWER button on the front panel, the Power LED should show green and the LCD display illuminates. Note that you will need to wait for approximately 40 seconds for *Crystalio* to initialize and for video to display.

If you do not see video as expected, refer to the [Troubleshooting] section.

4.2 – Select Input Terminal

Using remote control

Press the button of the type of input terminal via which your input device has been connected.

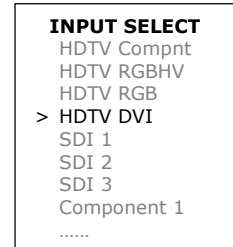
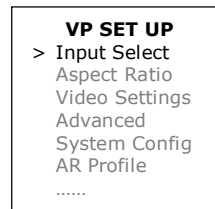


Note: For HDTV analogue input, repeat pressing the HDTV button to cycle through the HDTV Component, RGB, and RGBHV option.

OR

Using front panel control

- 1 Press **SETUP** button  to start VP SETUP
- 2 Choose Input Select, press **OK** button to continue

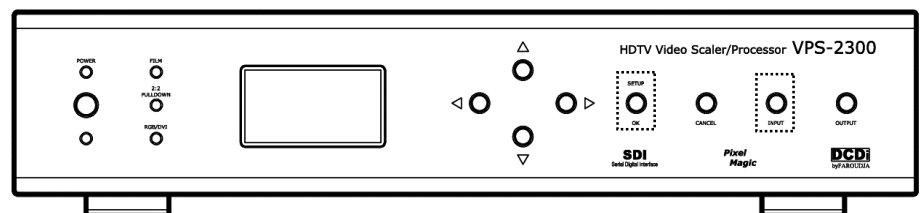


- 3 Choose input terminal via which your input device is connected
- 4 Press **OK** button to confirm

OR

Using front panel control

Press the **INPUT** button to cycle through the various input terminals and stop at the one by which your input device is connected.



4 Basic Software Setup

4.4 – Select Output Terminal

Using front panel control

- 1 Press **SETUP** button  to start VP SETUP
- 2 Choose System Config, press **OK** to continue

```

VP SET UP
Input Select
Aspect Ratio
Video Settings
Advanced
> System Config
AR Profile
Video Profile
Pixel Magic
    
```

```

SYSTEM CONFIG
Input Format
HD Active Wnd
> Output Select
Resolution
Output Format
H sync /V sync
Pre Y/C Delay
.....
    
```

- 3 Choose Output Select, press **OK** to continue
- 4 Choose **DVI** for digital device or **RGBHV / YPbPr / YCbCr / RGB(Cs)** for analogue device

```

OUTPUT SELECT
RGBHV
> DVI
YPbPr
YCbCr
RGB(Cs)
    
```

```

OUTPUT SELECT
> RGBHV
DVI
YPbPr
YCbCr
RGB(Cs)
    
```

- 5 Press **OK** button to confirm

4.5 – Set Output Format / Resolution

Setting Output Format for Analogue devices

- 1 Press **SETUP** button  to start VP SETUP
- 2 Choose System Config, press **OK** to continue

```

VP SET UP
Input Select
Aspect Ratio
Video Settings
Advanced
> System Config
AR Profile
Video Profile
Pixel Magic
    
```

```

SYSTEM CONFIG
Input Format
HD Active Wnd
Output Select
Resolution
> Output Format
H sync /V sync
Pre Y/C Delay
.....
    
```

```

OUTPUT FORMAT
480p @59.94Hz
> 480p @60Hz
540p @60Hz
576p @60Hz
.....
    
```

- 3 Choose Output Format, press **OK** to continue
- 4 Choose output format of the display device being connected in the OUTPUT FORMAT menu
- 5 Press **OK** button to confirm

Setting Resolution for Digital devices

- 1 Press **SETUP** button  to start VP SETUP
- 2 Choose System Config, press **OK** to continue

```

VP SET UP
Input Select
Aspect Ratio
Video Settings
Advanced
> System Config
AR Profile
Video Profile
Pixel Magic
    
```

```

SYSTEM CONFIG
Input Format
HD Active Wnd
Output Select
> Resolution
Output Format
H sync /V sync
Pre Y/C Delay
.....
    
```

- 3 Choose Resolution, press **OK** to continue
- 4 Choose the resolution of your display device from the list and press **OK** button to confirm

```

RESOLUTION
> Preset Models
800 x 600
848 x 480
856 x 480
.....
    
```

```

PRESET MODELS
> Epson TW100
Fuj 1024x1024
Hitachi 40 Alis
InFocus 7205
.....
    
```

OR

- 5 Choose Preset Models, press **OK** to continue
- 6 Select the display device being connected
- 7 Press **OK** button to confirm

TIPS: For optimum display, you should set *Crystalio* to output a video signal that matches your display perfectly in terms of resolution and aspect ratio. See Section 5 Expert Configuration for details on how to achieve this.

Congratulations! You have now completed the basic configuration. In the following sections, there is much more fine-tuning that you can do to fully optimize the performance.

5 Expert Configuration

5.1 – Overview

Digital display devices create the picture from a large number of pixels or points of light. The best picture with these devices is achieved by:-

- Delivering the picture signal digitally by using digital video interface (DVI)
- Sending a picture that 'fits' exactly the number of pixels that the display device physically has. This is known as 1:1 pixel mapping or driving the display at its 'native resolution'

Analogue display devices are not built up from individual pixels, as such they do not have a 'native resolution'. However, they have a range of resolutions where they can deliver the best performance, therefore it is recommended to utilize in that mode.

Although optimum resolution varies from one display device to another, this would not be causing setback to *Crystalio*, since it has been designed to match the resolution of almost any display device available in the market.

What makes *Crystalio* distinguished from the ordinary video processors among various state-of-the-art technologies incorporated is, that the sophisticated control allows users to have the flexibility to configure every single aspect of video processing.

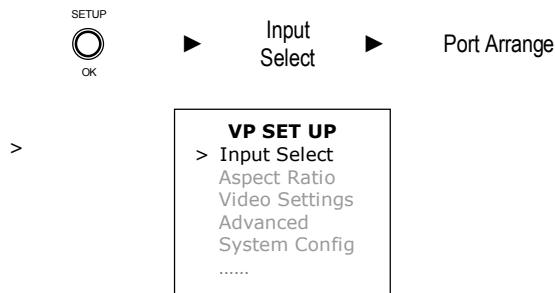
Crystalio provides expert users with a diverse range of options and settings for customizing the system to suit their specific needs and preferences. These include color fine-tuning and enhancement, aspect ration control, re-defining remote control buttons, customizing menu display, saving display profiles, *etc.* These options allow users to be able to control the display settings precisely and to have quality video viewing experience. With such control, users could maximize the performance of any video sources and exploit the capability of almost any display devices.

5 Expert Configuration

5.2 – Input Select

This option allows you to select the active video source. Note that if you have configured *Crystalio* to hide 1 or more sources, these sources will not be shown.

Setup



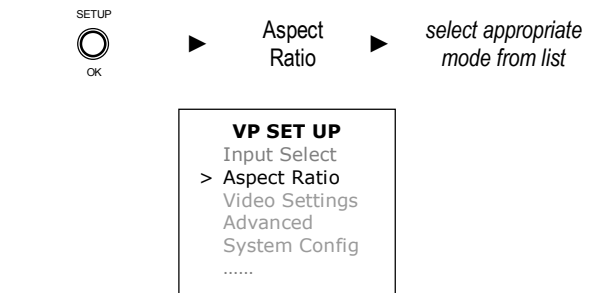
Available Modes

Input Select	Input	Format
HDTV Compnt	HD Analogue	Component (YpbPr)
HDTV RGBHV	HD Analogue	RGBHV
HDTV RGB	HD Analogue	RGB sync on Green
HDTV DVI	HD Digital DVI	DVI
SDI 1	SDI 1	SDI
SDI 2	SDI 2	SDI
SDI 3	SDI 3	SDI
Component 1*	Component 1	Component (YpbPr)
Component 2*	Component 2	Component (YpbPr)
S-Video 1	S-Video 1	Svideo
S-Video 2	S-Video 2	Svideo
Video 1	Composite video 1	Composite (CVBS)
Video 2	Composite video 2	Composite (CVBS)
RGB 1*	RGB sync on Green 1	RGB sync on Green (RGsB)
RGB 2*	RGB sync on Green 2	RGB sync on Green (RGsB)
RGBs 1*	RGB separate sync 1	RGB Separate Sync (RGSB)
RGBs 2 *	RGB separate sync 2	RGB Separate Sync (RGSB)

5.3 – Aspect Ratio

Crystalio features sophisticated Aspect Control management by using UltraAR™, allowing almost any aspect ratio (including custom ratios) to be used with almost any device.

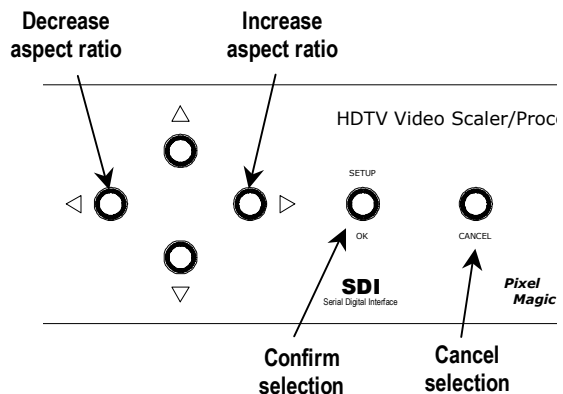
Setup



Available Modes

Aspect Ratio	Source Material Aspect Ratio
4:3	4:3
16:9	16:9
16:9 Letterbox	16:9 Letterbox
2.35:1	Anamorphic 2.35:1
Same as Screen	Use this mode if the source image aspect ratio is same as screen aspect ratio
Customize	Allows custom control over the aspect ratio for non standard material

TIPS: For Customized option, use the Navigation Buttons on the front panel to set up customized aspect ratio.



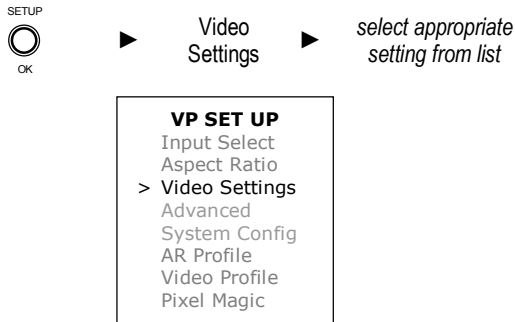
Note: Increment / decrement of aspect ratio is 0.05, except that it will also stop at 4:3 (1.33:1) and 16:9 (1.78:1)

5 Expert Configuration

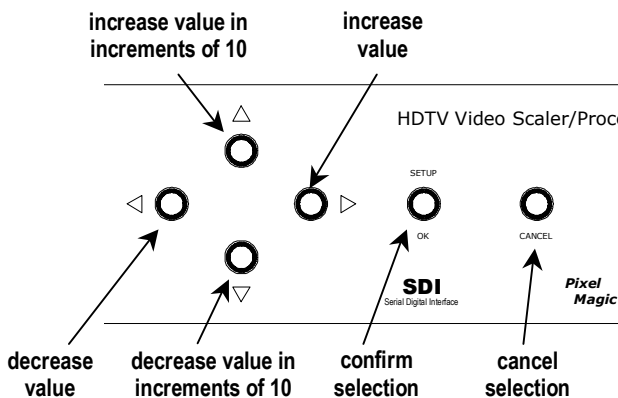
5.4 – Video Settings

Crystalio allows you to configure the appearance of the video being displayed with a range of parameters.

Setup



Note: Use Navigation Buttons on the front panel to set up:



Available Modes

Video Setting	Function	Available range
Brightness	Adjusts display brightness	-999 to 999
Contrast	Adjusts display contrast	-18 to 14
Colour	Adjusts display colour saturation	-99 to 99
Hue	Adjusts display hue	-180 to 180
Sharpness	Adjusts display sharpness <i>Note: This setting is same as adjust TrueLife Luma Edge Eff.</i>	0 to 100
R Offset	Adjusts Red element of display saturation	-999 to 999
G Offset	Adjusts Green element of display saturation	-999 to 999
B Offset	Adjusts Blue element of display saturation	-999 to 999
R Gain	Adjusts Red gain	-99 to 99
G Gain	Adjusts Green gain	-99 to 99
B Gain	Adjusts Blue gain	-99 to 99
Black Enhancer	Black Enhancer improves black level details	Natural Black / Enhanced Black
Voltage Pump	Voltage Pump drives analogue output voltage up <i>Note: This setting is available when analogue output is selected.</i>	On / Off

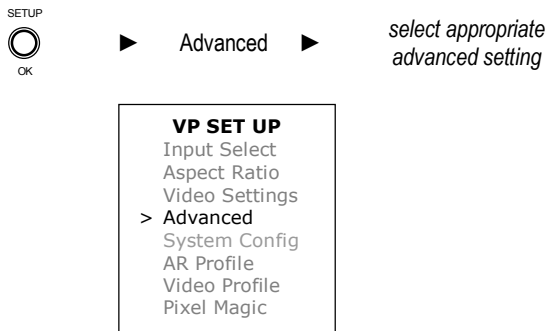
5 Expert Configuration

5.5 – Advanced

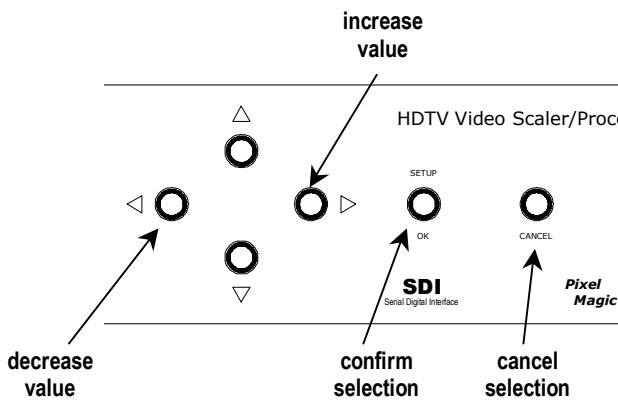
The settings introduced in this section allows *Crystalio* to be configured to suit complex environments, enabling you to configure many of the Faroudja video processing options to maximize the picture quality.

Note: The DCDi®, De-interlace and Noise Reducer will be hidden in this menu if HDTV input has been selected.

Setup



Note: Use Navigation Buttons on the front panel to set up:



Available Modes

Advanced	Available modes
DCDi®	<p>Faroudja developed DCDi® (Directional Correlational De-interlacing) technology to eliminate the jaggedness that conventional up-converters introduced to diagonal edges in video. DCDi®'s unique algorithm identifies all the moving edges in a scene and adjusts the angle of interpolation at each pixel so that the interpolation always follows the edge instead of crossing it, eliminating stair-casing or jagged edge artifact, to produce a smooth and natural looking image.</p> <p>On Activate DCDi® de-interlacing</p> <p>Off Deactivate DCDi® de-interlacing</p>
Deinterlace	<p>Auto <i>Crystalio</i> will automatically select the most appropriate de-interlace method. The method selected can either be</p> <ul style="list-style-type: none"> • DCDi® • Film 3:2 Pulldown • Film 2:2 Pulldown Even (PAL only) • Film 2:2 Pulldown Odd (PAL only) <p>Video DCDi® de-interlacing only</p> <p>NTSC@30 On <i>Crystalio</i> will automatically select the most appropriate de-interlace method. The method selected can either be</p> <ul style="list-style-type: none"> • Film 3:2 Pulldown • Film 2:2 Pulldown Even (NTSC/PAL) • Film 2:2 Pulldown Odd (NTSC/PAL) • DCDi® <p>2:2 Even Film 2:2 Pulldown Even</p> <p>2:2 Odd Film 2:2 Pulldown Odd</p> <p><i>Note: If DCDi® is switched off in the Advanced menu setting, simple video de-interlace will be used instead of DCDi</i></p>

Advanced	Available modes
Noise Reducer	<p>This is useful for improving the quality of off-air material.</p> <p><i>Options:</i></p> <ul style="list-style-type: none"> • Hi • Medium • Lo • Off
True Life™	<p>Conventional video enhancement is done by a “peaking filter” that enhances the high-frequency components of the video signal. However, this creates unwanted artifacts. Faroudja does not use a peaking filter to enhance an image, instead it uses its TrueLife™ Enhancement technology to identify transitions considered to be the details in an image such as skin texture, freckles or hair. These detail transitions are deliberately enhanced making them more visible and more lifelike. The technology also enhances large edges to create greater depth of perception without introducing visual artifacts or distortion.</p> <p>Detail Eff Sets the level of Horizontal Detail enhancement</p> <p>Detail Thd Sets the threshold point for the introduction of Horizontal Detail enhancement</p> <p>Luma Edge Eff Sets the level of Horizontal Edge Luma enhancement</p> <p>Luma Edge Thd Sets the threshold point for the introduction of Horizontal Edge Luma enhancement</p> <p>Chroma Edge Eff Sets the level of Horizontal Edge Chroma enhancement</p> <p>Chroma Edge Thd Sets the threshold point the introduction of Horizontal Edge Chroma enhancement</p> <p>V Luma Edge Eff Sets the level of Vertical Details enhancement</p> <p>V Luma Edge Thd Sets the threshold point for the introduction of Vertical Detail enhancement</p>

Advanced	Available modes
Zoom	<p>This setting allows the displayed image to be scaled to perfectly fit the display device.</p> <p>Full Width <i>Crystalio</i> will set the width of the image to match the dimensions of the display device</p> <p>Full Height <i>Crystalio</i> will set the height of the image to match the dimensions of the display device</p> <p>Best Fit This automatically selects Full Width and Full Height options together, so that the image displayed fills the dimensions of the display device.</p> <p>Source Width <i>Crystalio</i> will set the width of the image to match the dimensions of the video source. No horizontal scaling is taking place in this mode</p> <p>Source Height <i>Crystalio</i> will set the height of the image to match the dimensions of the video source. No vertical scaling is taking place in this mode</p> <p>Customize This allows fine manual control over the exact image size</p> <p><i>Note: Zoom takes place in increments of 0.02. The displayed image can not be enlarged beyond 10 times the original source image dimensions, nor can it be reduced to less than half of the source image dimensions.</i></p> <p>Zoom In <i>Crystalio</i> will enlarge the image by increments of x0.1</p> <p>Zoom Out <i>Crystalio</i> will shrink the image by decrements of x0.1</p> <p>Zoom to Line <i>Crystalio</i> will enlarge/shrink the image to exact line</p>

<p>Position</p>	<p>This setting allows the displayed image to be moved to perfectly fit the display device.</p> <p>Center</p> <p>Crystalio will reset the image position to be central on the display device</p> <p>Customize</p> <p>This allows fine manual control over the exact image position (Use Navigation Buttons on the front panel to set up)</p> <p><i>Note: When initially pressing the arrow keys, the image will move 30 pixels at a time. If the same arrow key is held, the movement will accelerate. Similarly if the opposite key is pressed, the movement will decelerate.</i></p> <p><i>Crystalio automatically limits the position function to ensure that the image is not moved completely off the visible area</i></p>
<p>Crop</p>	<p>The crop function allows areas of the displayed image to be masked, useful if you do not want part of the image to be visible on the display device.</p> <p>Crop Top</p> <p>Crystalio will remove a section of the top area of the image</p> <p>Crop Bottom</p> <p>Crystalio will remove a section of the bottom area of the image</p> <p>Crop Left</p> <p>Crystalio will remove a section of the left area of the image</p> <p>Crop Right</p> <p>Crystalio will remove a section of the right area of the image</p> <p><i>Use Navigation Buttons on the front panel to set up</i></p> <p><i>Note: When initially pressing the arrow keys, the image will crop 30 pixels at a time. If the same arrow key is held, the crop rate will accelerate. Similarly if the opposite key is pressed, the crop rate will decelerate.</i></p>

<p>Film Detect</p>	<p>This defines the film mode detection window. On some cases when the source has sub-title, the de-interlacing method used may not be correct. So, use this control for adjustment.</p> <p>Normal Wnd</p> <p>Uses whole image for detection</p>  <p>Small Wnd</p> <p>Uses partial image for detection</p> 
<p>Film Bias Control</p>	<p>This can be set to a value ranging from 1 to 9, with the smallest value suitable for most video sources, while the greater values better suit film sources.</p>
<p>NLS Config</p>	<p>Non-Linear Stretching is used to fill a full 16:9 screen with a 4:3 image while minimizing the widening effect on the image especially at center of the screen. There are two parameters, Center Shape and Crop to Fit, to stretch the image according to personal preference.</p> <p>Center Shape</p> <p>This controls the shape of image in center area. Setting of 3 makes the image look good at center, but with more distortion at left and right sides.</p> <p>Setting of 0 produces a less non-linear stretched image across the whole screen, resulting in obvious distortion at the center of the image.</p>

Advanced Available modes

NLS Config (cont'd)

The following pictures show different settings of Center Shape from 0 to 3, with Crop to Fit being set to default value of 2.



Center Shape = 0 (produces a less non-linear stretched image)



Center Shape = 1



Center Shape = 2



Center Shape = 3 (Horizontal stretching takes place mainly at the two sides, resulting in minimum horizontal stretching at center)

Advanced Available modes

NLS Config (cont'd)

Crop to Fit

This controls how the image is being cropped at the top and bottom. Cropping the image results in less horizontal stretching.

Setting of 0 results in no cropping. Setting of 3 results in maximum cropping at the top and bottom.

The following pictures show different settings of Crop to Fit from 0 to 3, with Center Shape being set to default value of 2.



Crop to Fit = 0




Crop to Fit = 1



Crop to Fit = 2



Crop to Fit = 3 (Maximum cropping)

Advanced	Available modes
Back Light	<p>Crystalio can black out the LCD display to avoid LCD back light affecting video viewing.</p> <p>On</p> <p>The LCD is illuminated whenever Crystalio is running (i.e. not in standby mode)</p> <p>Active</p> <p>The LCD is illuminated whenever the Crystalio settings are being accessed (such as menu is being selected). After a short period of inactivity, the illumination will switch off automatically.</p> <p>Off</p> <p>The LCD backlighting is disabled.</p>
LED	<p>Similar to LCD back light, the LEDs on the front panel can be blacked out.</p> <p>Active</p> <p>The LEDs are illuminated to show the current status</p> <p>Off</p> <p>The LEDs are disabled</p> <p><i>Note: the Power LED cannot be disabled.</i></p>
Hide Input	<p>Crystalio has a comprehensive set of input connections. For ease of use it may be more convenient to remove any unused inputs from the menu selections. For example, if you are not using Composite video connections, then by hiding these inputs it reduces 8 items from the input menu.</p> <p>Setup</p>  <p> <ul style="list-style-type: none"> • Select which input to hide from the list • Select either Hide or Show as required </p> <p><i>Note: The current input cannot be hidden.</i></p>

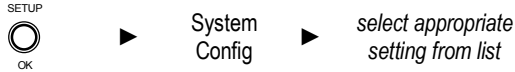
Advanced	Available modes
Remap Button	<p>On Crystalio remote control, there are no "16:9 Letter Box" nor "Toggle D/A" buttons. User can redefine some buttons to perform these operations.</p> <p>16:9 Letter Box</p> <ul style="list-style-type: none"> • N/A : default • 2:35:1 : [2.35:1] button is replaced with [16:9 LetterBox] function <p>Toggle D / A</p> <ul style="list-style-type: none"> • N/A : default • LED ACTIVE : [LED ACTIVE] button is replaced with [Toggle D/A] function • LED OFF : [LED OFF] button is replaced with [Toggle D/A] function • LCD ON : [LCD ON] button is replaced with [Toggle D/A] function • LCD ACTIVE : [LCD ACTIVE] button is replaced with [Toggle D/A] function • LCD OFF : [LCD OFF] button is replaced with [Toggle D/A] function
Firmware Upgrade	<p>This allows the Crystalio internal software to be updated, either from a USB thumb disk, or via the network connection.</p> <p>For detailed instructions, please refer to http://www.crystalio.com/support.html</p>

5 Expert Configuration

5.6 – System Config

The settings in this section are used during the initial installation and setup. These settings include defining the display device parameters, connection types etc.

Setup



<p>VP SET UP Input Select Aspect Ratio Video Settings Advanced > System Config AR Profile Video Profile Pixel Magic</p>

Available Modes

System Config	Available modes
Input Format	If [SDTV Input] is selected, the following input formats are available: <ul style="list-style-type: none"> • SDTV Standard Definition video – with auto format selection (NTSC or PAL) • 480i (NTSC) 480 interlaced NTSC video • 576i (PAL) 576 interlaced PAL video If [S-Video Input] or [Video Input] is selected, the following input format is available: <ul style="list-style-type: none"> • PAL60 PAL 60 video

System Config	Available modes
Input Format (cont'd)	If [HDTV Input] is selected, the following input formats are available: <ul style="list-style-type: none"> • 480p (NTSC) 480 progressive scan NTSC video • 576p (PAL) 576 progressive scan PAL video • 720p 720 Hi-Definition (HD) progressive scan video • 1080i@50Hz 1080 Hi-Definition (HD) interlaced video with refresh rate 50 frames per second • 1080i@60Hz 1080 Hi-Definition (HD) interlaced video with refresh rate 60 frames per second • 800x600p Video source of 800x600 resolution • 1024x768p Video source of 1024x768 resolution • 1280x1024p Video source of 1280x1024 resolution • HDTV Hi-Definition (HD) video – with auto format selection <p><i>Note: If the input format is incorrectly set, no image will be displayed</i></p>

System Config	Available modes
---------------	-----------------

System Config	Available modes
---------------	-----------------

HD Active Wnd	<p>This adjusts the position of active window of HD input source. For different HD source input, this value may need adjustment to get the whole video.</p> <p>X : This adjusts the horizontal (X) position of HD active window</p> <p>Y : This adjusts the vertical (Y) position of HD active window</p> <p><i>Note: HD Active Wnd is only available for Hi-Definition input ports. Each HD input port records its own HD Active Wnd setting.</i></p>
Output Select	<p>This configures which video output terminal the video signal is sent to.</p> <p>RGBHV Analogue output in RGBHV format</p> <p>DVI Digital output</p> <p>YPbPr Analogue output in component video (YPbPr)</p> <p>YCbCr Analogue output in component video (YCbCr)</p> <p>RGB(Cs) Analogue output in RGB format with composite sync</p> <p>If digital output terminal (e.g. DVI) is selected, the next step is to set the <u>output resolution</u> that must conform with the digital output device</p> <p>If, however, analogue terminal is selected, the <u>output format</u> should be set to match the analogue output device</p>

Resolution	<p>For optimum performance, it is essential that this setting is correct for the connected <u>digital display</u>.</p> <div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin: 10px 0;"> <p>Hint: If your output display device is under the [Preset Models] list, you can simply select the model there.</p> <p>Otherwise, check the native resolution of your output device and select such from the resolution list or use [Customize] to define the resolution of your device.</p> </div> <p>Preset Models</p> <p>Choose from a library of popular displays:</p> <ul style="list-style-type: none"> • Epson TW100 • Fuj 1024x1024 • Hitachi 42 ALis • InFocus 7205 • Mrz VP-12S3 • JVC SX21 • JVC DLA-G10 • JVC DLA-G11 • JVC DLA-G15 • JVC DLA-G20 • JVC DLA-HX1 • JVC DLA-M2000 • JVC DLA-M15U • NEC 42MP2 • Pana PT-AE500 • Pana TH-42PHW6 • Sanyo PLV-Z2 • Sharp 201 • Shp XV-Z12000U • Sony Qualia • Sony HS-10 • Panasonic TH-50PHD6 <p>Or, select the native resolution of your output display device from the list:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>800 x 600</td><td>1366 x 768</td></tr> <tr><td>848 x 480</td><td>852 x 480</td></tr> <tr><td>856 x 480</td><td>852 x 576</td></tr> <tr><td>960 x 540</td><td>1024 x 576 (1)</td></tr> <tr><td>1024 x 768</td><td>1024 x 852</td></tr> <tr><td>1280 x 720</td><td>1024 x 1024</td></tr> <tr><td>1280 x 768</td><td>1360 x 1024</td></tr> <tr><td>1280 x 960</td><td>1360 x 1024 (1)</td></tr> <tr><td>1280 x 1024</td><td>1360 x 1024 (2)</td></tr> <tr><td>1360 x 768</td><td>1365 x 1024</td></tr> <tr><td>1368 x 768</td><td>1365 x 1024 (1)</td></tr> <tr><td>1400 x 1050</td><td>1400 x 788</td></tr> <tr><td>1440 x 960</td><td>1440 x 1152</td></tr> <tr><td>1152 x 864</td><td>1440 x 720</td></tr> <tr><td>1024 x 1024 ALis</td><td>1920 x 1080</td></tr> <tr><td>1024 x 576</td><td></td></tr> </table>	800 x 600	1366 x 768	848 x 480	852 x 480	856 x 480	852 x 576	960 x 540	1024 x 576 (1)	1024 x 768	1024 x 852	1280 x 720	1024 x 1024	1280 x 768	1360 x 1024	1280 x 960	1360 x 1024 (1)	1280 x 1024	1360 x 1024 (2)	1360 x 768	1365 x 1024	1368 x 768	1365 x 1024 (1)	1400 x 1050	1400 x 788	1440 x 960	1440 x 1152	1152 x 864	1440 x 720	1024 x 1024 ALis	1920 x 1080	1024 x 576	
800 x 600	1366 x 768																																
848 x 480	852 x 480																																
856 x 480	852 x 576																																
960 x 540	1024 x 576 (1)																																
1024 x 768	1024 x 852																																
1280 x 720	1024 x 1024																																
1280 x 768	1360 x 1024																																
1280 x 960	1360 x 1024 (1)																																
1280 x 1024	1360 x 1024 (2)																																
1360 x 768	1365 x 1024																																
1368 x 768	1365 x 1024 (1)																																
1400 x 1050	1400 x 788																																
1440 x 960	1440 x 1152																																
1152 x 864	1440 x 720																																
1024 x 1024 ALis	1920 x 1080																																
1024 x 576																																	

System Config	Available modes
Resolution (cont'd)	<p>Customize</p> <p>If your display does not match any of the pre-defined settings, you can enter the parameters here to match <i>Crystalio</i> exactly with its characteristics.</p> <p><i>Note: Before you modify these settings, it is important that you check the capabilities of the display device. Incorrect settings might cause permanent damage to your display. If you are in any doubt, contact your display manufacturer / dealer for advice.</i></p> <p>Setting up Customize</p> <ul style="list-style-type: none"> • H. Scan Rate Enter the horizontal scan rate in the format xxx.yyy KHz • H. Active Pixel Enter the number of horizontal active pixels • H. Front Porch Enter the horizontal front porch • H. Sync Width Set the horizontal sync width • H. Back Porch Enter the horizontal back porch • V. Refresh Rate Enter the vertical refresh rate in the format xx.yy frames per second • V. Active Pixel Enter the number of vertical active pixels • V. Front Porch Enter the vertical front porch • V. Sync Width Set the vertical sync width • V. Back Porch Enter the vertical back porch • Confirm Confirm the above settings

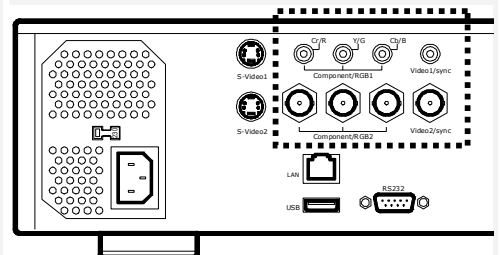
System Config	Available modes
Resolution (cont'd)	<p>Customized Timing</p> <p>The customized timing will store the user defined timing. The timing will be stored even user turn off <i>Crystalio</i></p> <ul style="list-style-type: none"> • Apply Apply the current selected customized timing • Edit Change the customized timing detail. The procedure is same as Customize • Delete Delete the current customized timing <i>Note: If current customized timing is in use or used by DynaVOut, this customized timing cannot be deleted.</i> • Rename Rename the customized timing <p><i>Note: User can store up to 50 customized timing in Crystalio</i></p>
Output Format	<p>This configures the format of the <u>analogue</u> video outputs.</p> <p>480p@59.94Hz 480 progressive NTSC video with 59.94Hz refresh rate</p> <p>480p@60Hz 480 progressive NTSC video with 60Hz refresh rate</p> <p>540p@60Hz 540 progressive video</p> <p>576p@50Hz 576 progressive PAL video</p> <p>720p@60Hz 720 Hi-Definition (HD) progressive video</p> <p>768p@60Hz 768p Hi-Definition (HD) progressive video</p> <p>960p@59.94Hz 960 Hi-Definition (HD) progressive video (1440x960) with 59.94Hz refresh rate</p> <p>960p@59.94Hz 960 Hi-Definition (HD) progressive video (1440x960) with 60Hz refresh rate</p> <p>1024p@60Hz 1024 Hi-Definition (HD) progressive video</p>

System Config	Available modes
Output Format (cont'd)	<p>1050p@60Hz 1050 Hi-Definition (HD) progressive video</p> <p>1080i@50Hz 1080 Hi-Definition (HD) interlaced video with 50Hz refresh rate</p> <p>1080i@60Hz 1080 Hi-Definition (HD) interlaced video with 60Hz refresh rate</p> <p>1080p@60Hz 1080 Hi-Definition (HD) progressive video</p> <p>1152p@50Hz 1152 Hi-Definition (HD) progressive video (1440x1152)</p> <p>720p@60Hz(1) 720 Hi-Definition (HD) progressive video but with different timing as before</p> <p>1080i@59.94(1) 1080 Hi-Definition (HD) progressive video but with different timing as before</p> <p>720p@50Hz 720 Hi-Definition (HD) progressive video</p> <p>720p@50Hz(1) 720 Hi-Definition (HD) progressive video but with different timing as before</p> <p>Set Refresh Rt If your display does not match the pre-defined refresh rate settings, you can enter the parameters here to match <i>Crystalio</i> exactly to its characters.</p> <p>Choose from following options:</p> <ul style="list-style-type: none"> • @24 • @25 • @30 • @48 • @50 • @59.94 • @60 • @72 • Customize <p><i>Note: Before you modify these settings, it is important that you check the capabilities of the display device. Incorrect settings might cause permanent damage to your display. If you are in any doubt, contact your display manufacturer / dealer for advice.</i></p>

System Config	Available modes
Output Format (cont'd)	<p>Customized Timing <i>The customized timing will store the user defined timing. The timing will be stored even user turn off Crystalio</i></p> <ul style="list-style-type: none"> • Apply <i>Apply the current selected customized timing</i> • Edit <i>Change the customized timing detail. The procedure is same as Customize</i> • Delete <i>Delete the current customized timing</i> <i>Note: If current customized timing is in use or used by DynaVOut, this customized timing cannot be deleted.</i> • Rename <i>Rename the customized timing</i> <p><i>Note: User can store up to 50 customized timing in Crystalio</i></p>
DynaVOut	<p>When activated, <i>Crystalio</i> will set the output video format dynamically based on the input video.</p> <p>When NTSC IN Options:</p> <ul style="list-style-type: none"> • Resolution • Format <p>Output Resolution or Format will change automatically when input format is 480i (NTSC)</p> <p>When PAL IN Options:</p> <ul style="list-style-type: none"> • Resolution • Format <p>Output Resolution or Format will change automatically when input format is 576i (PAL)</p>

System Config	Available modes
H-Sync / V-Sync	<p>This sets the H-Sync (horizontal position) and V-Sync (vertical position) values. H-Sync and V-Sync are used to adjust the output video so that the active region (viewable part) is mapped currently (centered or fitting within) the output display device.</p> <p><i>Note: This function is different from the [Position] function as [Position] moves the video within the active region of the output video while [H-Sync / V-Sync] moves the whole output video.</i></p> <p><i>Therefore, this is a "System Config" function instead of an "Advanced" function. For any particular output display device, it needs to be set up once.</i></p> <p>The Pixel Magic function includes a chapter to guide you to set up H-Sync and V-Sync. Please refer to section [Pixel Magic] function.</p>
Pre Y/C Delay	<p>This sets the Pre YC delay. The Pre YC delay refers to the input source.</p> <p>Level 1 to Level 8 refer to different Pre Y/C delay timing.</p>
Post Y/C Delay	<p>This sets the Post YC delay. The Post YC delay refers to the output video.</p> <p>Level 1 to Level 8 refer to different Post Y/C delay timing.</p>
Screen A R	<p>Set the screen Aspect Ratio.</p> <p>Map Resolution</p> <p>In this mode, <i>Crystalio</i> looks at the pixel dimension of the configured display device and sets the aspect ratio accordingly. E.g. if the display has a resolution set to 1024x768, the aspect ratio is deemed to be 4:3.</p> <p>4:3</p> <p>This sets screen aspect ratio to 4:3 (1.33:1)</p> <p>16:9</p> <p>This sets screen aspect ratio to 16:9 (1.78:1)</p> <p>2.35:1</p> <p>This sets screen aspect ratio to 2.35:1 (1.33:1)</p> <p>Customize</p> <p>This allows the screen aspect ratio to be set to a non-standard / customized setting</p> <p><i>Note: The aspect ratio adjustment increment is 0.05, except that it will also stop at 4:3 (1.33:1) and 16:9 (1.78:1).</i></p>

System Config	Available modes
SDI Polarity	<p>This option sets the SDI input polarity.</p> <p>SDI1</p> <p>Set SDI1 input source polarity between positive or negative, or choose [auto detect] for automatic detection</p> <p>SDI2</p> <p>Set SDI2 input source polarity between positive or negative, or choose [auto detect] for automatic detection</p> <p>SDI3</p> <p>Set SDI2 input source polarity between positive or negative, or choose [auto detect] for automatic detection</p> <p><i>Note: Incorrect polarity will make the output video shaking</i></p>
Output Sync	<p>Adjust the output sync polarity.</p> <p>H-Sync</p> <ul style="list-style-type: none"> Negative Positive <p>V-Sync</p> <ul style="list-style-type: none"> Negative Positive <p><i>Note: Output Sync only available for analogue output selected</i></p>
Port Arrange	<p>This option sets the port arrangement for the rear panel.</p> <p>Upper Port</p> <p>Set the upper port to one of the following:</p> <ul style="list-style-type: none"> Component1 RGBS1 RGB1 <p>Lower Port</p> <p>Set the lower port to one of the following:</p> <ul style="list-style-type: none"> Component2 RGBS2 RGB2



System Config	Available modes
DVI PassThr	<p>This is for using HDTV DVI input. User can select this option to enable DVI pass through such that no scaling will be performed by <i>Crystalio</i>. The input video source to <i>Crystalio</i> will be directly outputted to the display device.</p> <p>On Enable DVI Pass Through</p> <p>Off Disable DVI Pass Through</p>
Hardware Reset	<p>This option resets all <i>Crystalio</i> hardware settings. All saved options will be cleared.</p>
Factory Setting	<p>This option sets <i>Crystalio</i> back to factory defaults. The default factory settings are as follows:</p> <ol style="list-style-type: none"> Input Select SDI 1 Aspect Ratio Same as Screen Video Settings <ul style="list-style-type: none"> Brightness = 0 Contrast = 0 Color = 0 Hue = 0 Sharpness = 0 R Offset = 0 G Offset = 0 B Offset = 0 R Gain = 0 G Gain = 0 B Gain = 0 Black Enhancer = Natural Black Voltage Pump = Off 4. Advanced <ul style="list-style-type: none"> DCDi = On De-interlace = Auto Noise Reducer = Off True Life ▶ all Effects = 0 True Life ▶ all Threshold = 0 Zoom = Best Fit Position = 0,0 Crop ▶ Left, Right, Top, Bottom = 0 Film Detect = Normal Wnd NLS Config – Crop to Fit = 2 NLS Config – Center Shape = 2 Back Light = Active LEDs = Active Hide Input ▶ all Input Terminals = Show

System Config	Available modes
Factory Setting (Cont'd)	<p>5. System Config</p> <p>Input Format ▶ all standard definition (SD) video input terminals = SDTV</p> <p>Input Format ▶ all hi-definition (HD) video input terminals = HDTV</p> <p>Output Selection = DVI</p> <p>Resolution = 1024 x 768</p> <p>Output Format = undefined (Output is set to use exact resolution)</p> <p>DynaVout = not effective</p> <p>H-Sync/V-Sync = 0,0</p> <p>Screen A.R. = Map Resolution</p>

5 Expert Configuration

5.7 – AR Profile

Crystalio allows detailed configuration of aspect ratios, image size and position, and this feature is further enhanced by the ability to store up to 5 sets of aspect ratio profiles.

Each AR Profile stores the following settings:

- Aspect Ratio
- Zoom
- Position
- Crop

Setup



▶ AR Profile ▶ *select appropriate setting from list*

VP SET UP Input Select Aspect Ratio Video Settings Advanced System Config > AR Profile Video Profile Pixel Magic

Available Modes

AR Profile	Available modes
Store	<ol style="list-style-type: none">1. Select this to memorize the current video settings including:<ul style="list-style-type: none">• Aspect Ratio• Zoom• Position• Crop2. Select a profile to memorize the settings:<ul style="list-style-type: none">• User 1• User 2• User 3• User 4• User 5
Recall	<ol style="list-style-type: none">1. Select this to recall memorized aspect ratio settings covering:<ul style="list-style-type: none">• Aspect Ratio• Zoom• Position• Crop2. Select a memorized AR Profile to recall:<ul style="list-style-type: none">• User 1• User 2• User 3• User 4• User 5

5 Expert Configuration

5.8 – Video Profile

Crystalio allows detailed configuration of video parameters (color, contrast, brightness, etc) to be memorized into 5 different video profiles for subsequent fast retrieval.

Each Video Profile stores the following settings:

- Input Format
- Brightness
- Contrast
- Colour
- R, G, B Offset
- R, G, B Gain
- Hue
- Pre YC Delay
- Post YC Delay
- Sharpness
- Noise Reducer
- De-interlace Mode
- TrueLife setting

Setup



Video Profile



select appropriate setting from list

<p>VP SET UP Input Select Aspect Ratio Video Settings Advanced System Config AR Profile > Video Profile Pixel Magic</p>

Available Modes

AR Profile	Available modes
Store	<ol style="list-style-type: none"> 1. Select this to memorize the current video parameters including: <ul style="list-style-type: none"> • Input Format • Brightness • Contrast • Colour • R, G, B Offset • R, G, B Gain • Hue • Pre YC Delay • Post YC Delay • Sharpness • Noise Reducer • De-interlace Mode • TrueLife setting 2. Select a Video Profile to memorize the video parameters: <ul style="list-style-type: none"> • User 1 • User 2 • User 3 • User 4 • User 5
Recall	<ol style="list-style-type: none"> 1. Select this to recall memorized video parameters. 2. Select a memorized Video Profile to recall: <ul style="list-style-type: none"> • User 1 • User 2 • User 3 • User 4 • User 5

5 Expert Configuration

5.9 – Pixel Magic System

Crystalio provides an automated mechanism for setting the output display configuration of *Crystalio* to perfectly match those of your display device.

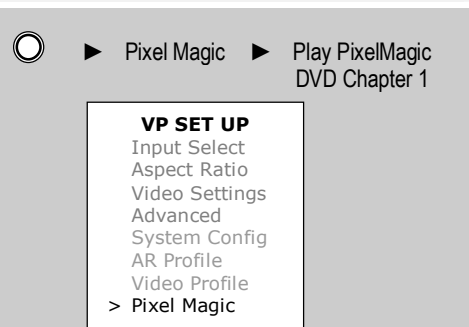
If you already know the settings of your display, you can select them via setting up Resolution (Section 4.5).

However, there may be circumstances where either the settings are not known, or are not listed in the library of standard settings. Pixel Magic System is a user-friendly system that allows you to interactively configure your display until you achieve a perfect image.

To use Pixel Magic System, you must have a DVD player connected to your display. Also, for best result, you should use a DVD player with a digital video connection. This means either a DVI or a SDI connection. The reason for this is that only a digital connection guarantees 100% lossless transfer of the DVD information to *Crystalio*, which is necessary for the most accurate setup result.

If you do not have access to a DVD player with digital connection, we recommend you to use the setup procedures described in Resolution (Section 4.5).

Setting Up Pixel Magic System

Step 1	Ensure that your DVD player is connected to <i>Crystalio</i> according to the recommendations (via a digital terminal). Switch ON DVD player and insert PixelMagic DVD disc.
Step 2	Ensure the DVD player is set as the input source of <i>Crystalio</i> .
Step 3	 <p>Play Chapter 1 of the PixelMagic DVD in your DVD player according to the instruction shown on the <i>Crystalio</i> display.</p>

Step 4	Press <RIGHT> button on the front panel to go to Page 2.
Step 5	<p><i>Crystalio</i> now scales the video so that it is exactly same size as the source resolution.</p> <p>If the timing is correct, select [Custom Timing] to customize the resolution timing. Alternatively, you can select [Move Pattern] and move the pattern to make sure every part of the screen is pixel perfect.</p> <p>When this is completed, press <RIGHT> button to go to Page 3.</p>
Step 6	<p>Follow instructions on Page 3, play PixelMagic DVD Chapter 2.</p> <p><i>Crystalio</i> now enlarges the video to fit the whole screen.</p> <p>You can now select [H-Sync / V-Sync] and adjust the active video so that it is at the correct position on screen.</p>
Step 7	<p>When this is completed, you can press <RIGHT> button to go to Page 4.</p> <p>You may choose to play any one of Chapter 3 to 6 of PixelMagic DVD to further examine whether the output timing is pixel perfect.</p>
Step 8	When this is completed, press <RIGHT> button to go back to the main menu.

Note: In any page of PixelMagic:

- Press <CANCEL> button to end the PixelMagic section
- Press <ENTER> button is the same as pressing <RIGHT> button

PixelMagic uses “2:2 pulldown” de-interlacing method throughout the whole process, so, you will see both “Film” and “2:2 pulldown” LEDs illuminated.

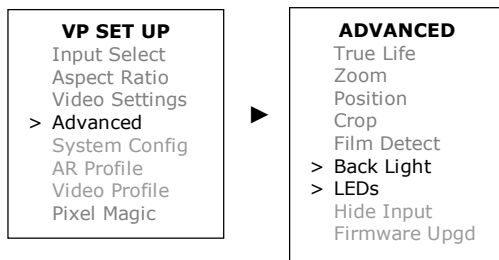
6 Troubleshooting

No LEDs displayed (including power)

- Check that the unit is connected to a working mains supply, and that it is switched on.

Power LED is On, but no other LEDs shown / LCD not showing a display

- Check options [Backlight] and [LEDs] have not been de-activated.



No picture is displayed

- Ensure that *Crystalio* is switched on.
- It may take up to 1 minute for *Crystalio* to complete its initialization process before the video can be displayed.
- Ensure correct video input has been selected and that is correctly cabled and the video source is active.
- Ensure the source video is of correct format. Refer to Section 5.6 System Config for more information.

Picture is displayed but is unstable

- Check cabling, particularly that the cable providing video sync is connected correctly.

Picture appears stretched

- Ensure that the aspect ratio of the video source material, video source device and *Crystalio* are all correctly set.

7 Specifications

Features

- Three SDI (Serial Digital Interface) inputs
- Digital DVI and analogue RGBHV/YCrCb outputs
- Directional Correlation De-interlacing (DCDi™) for optimal de-interlacing of original video material*
- All major TV output formats supported, including 480p, 540p, 576p, 720p, 1080i, 1080p and many more
- Advanced 6-tap, 64-phase scaler / up converter to offer top-notch scaling capability
- Full manual control of de-interlacing algorithms for advanced users
- Preset digital timings of popular digital display devices
- User-customizable output resolution to match your own display devices
- Tearless frame rate conversion, 50/60/72/75/100/120Hz
- Edit correction - film content is continuously monitored for any break in sequence caused by "bad edits" and quickly compensates for the most effective reduction in artefacts*
- TrueLife™ enhancer brings out details in the picture and produces a more life-like image
- Pixel Magic System™ to help users set *Crystalio*® output resolution to various display devices in pixel perfect mode
- UltraAR™ supports virtually any Video Image aspect ratio from 0.75:1 to 4.00:1, and Display Device aspect ratio from 1:1 to 3:1
- Ten user-customizable independent profiles for each input
- Motion Adaptive Noise Reduction to improve picture quality for analogue inputs
- Chroma filter to mask the Chroma Up-Sampling Error (also known as CUE or chroma-bug) of MPEG decoders
- Adaptive comb filter for excellent chrominance/luminance separation and reduced cross colour and cross luminance artefacts
- Real-time status information display on LCD panel including source, video format, output resolution, de-interlacing, aspect ratio, zoom, and more
- Non-linear stretching to display 4:3 material on 16:9 displays
- Film Mode Processing for proper de-interlacing of 3:2 and 2:2 pulldown material*
- HDTV up conversion, scaling and frame-doubling
- Brightness, Contrast and Saturation control
- R, G, B offset individual control
- Various Zoom controls including "Best Fit", "Full Width", "Full Height", and customization from 0.5 to 10 times screen height
- User-friendly user interface and remote control
- Firmware upgradeable through built-in Ethernet and USB ports
- CrystalWall feature to enable video wall applications using multiple *Crystalio* units and display devices

* For standard definition video only

Video Inputs

- SDI (Serial Digital Interface) input x 3
- Component/RGBs/RGsB input x 2
- Composite Video input x 2 (also used as sync for RGBs)
- S-Video input x 2
- HDTV analogue input x 1
- DVI input (HDCP compatible) x 1

Video Outputs

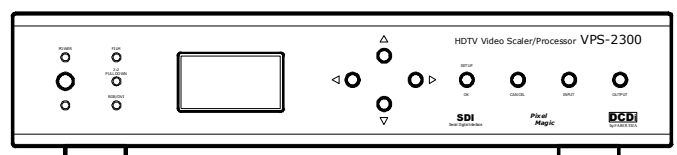
- Digital: DVI (HDCP compatible)
- Analogue: RGBHV or component video

User-Friendly Appliance

- Infrared remote control and LCD/LED on the front panel

General

- Dimensions: 438 x 322 x 88 mm / 17.2 x 12.7 x 3.5 inch
- Weight: 7 kg / 15.5 lbs
- Power: 110 / 220V AC user selectable, 35 W
- Regulatory approval: CE, UL, FCC



8 Safety Information

Important information

- To ensure maximum performance, please read this manual carefully. Keep it in a safe place for future reference.
- Install this unit in a cool, dry, clean place – away from windows, heat sources, sources of excessive vibration, dust, moisture and cold. Avoid sources of humming (transformers, motors). To prevent fire or electrical shock, do not expose the unit to rain or water.
- Never remove the unit cover. Contact your dealer if an object falls inside the unit.
- Do not use force on switches, controls or connection wires. When moving the unit, first disconnect the power plug and the wires connected to other equipment. Never pull on the wires themselves.
- The openings on the unit cover assure proper ventilation of the unit. If these openings are obstructed, the temperature inside the unit will rise rapidly. Therefore, avoid placing objects against these openings, and install the unit in a well-ventilated area to prevent fire and damage.
- Be sure to allow a space of at least 30 cm behind, 20 cm on the both sides and 10 cm above the top panel of the unit to prevent fire and damage.
- The voltage selector on the rear panel of this unit must be set for your local main voltage BEFORE plugging into the AC main supply. Voltages are 110/120/220/240 V AC, 50/60 Hz.
- The voltage used must be the same as that specified on this unit. Using this unit with a higher voltage than specified is dangerous and may result in fire or other accidents. PIXEL MAGIC SYSTEMS LTD. will not be held responsible for any damage resulting from use of this unit with a voltage other than specified.
- Digital signals generated by this unit may interfere with other equipment such as tuners, receivers or TVs. Move this unit farther away from such equipment if interference is observed.
- Do not attempt to clean the unit with chemical solvents; this might damage the finish. Use a clean, dry cloth.
- Be sure to read the “TROUBLESHOOTING” section regarding common operating errors before concluding that the unit is faulty.
- When not planning to use this unit for long periods of time, disconnect the AC power plug from the wall outlet.
- To prevent lightning damage, disconnect the AC power plug when there is an electrical storm.
- Grounding or polarization – Precautions should be taken so that the grounding or polarization of an appliance is not defeated.
- This unit is not disconnected from the AC power source as long as it is connected to the wall outlet, even if this unit itself is turned off. This state is called the standby mode. In this mode, this unit is designed to consume a small amount of power.

9 Support and Warranty Information

Product Support

Crystalio is designed to provide you with many years of viewing pleasure. If for any reason you encounter a problem with your *Crystalio* unit, please follow the following:

- Carefully follow the steps shown in Section 7, Troubleshooting; or
- Contact your dealer for advice.

!!Caution: Under **NO** circumstances should you attempt to open, repair or modify your *Crystalio* unit as this could expose you to electrical shock, and / or severely damage your *Crystalio*.

Product Warranty

Pixel Magic Systems Ltd. warrants *Crystalio* for One-Year from date of purchase to the original purchaser that this product is free from defects in material and workmanship. If, after inspection, you discover any defects in material or workmanship, Pixel Magic Systems Ltd. will have the option to repair, or replace the defective Pixel Magic Systems' product free of charge. This one-year warranty does not cover damages from normal wear and tear or from accidental damage, misuse, improper care, alterations and damage caused in transportation by a common carrier or airline.

There are no other warranties expressed or implied, including, but not limited to, the implied warranties of merchantability and the fitness for a particular purpose beyond the terms of this one-year warranty. The one-year warranty offered by Pixel Magic Systems Ltd. herein may not be modified by any oral representations made by any employee, agent or representative of Pixel Magic Systems Ltd.

Repair or replacement as provided under this warranty is the exclusive remedy of the consumer. Pixel Magic Systems Ltd. shall not be liable for any incidental or consequential damages for breach of any expressed or implied warranty on this product, except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose on this product is limited in duration to the duration of this warranty. If you need to have your Pixel Magic Systems' product repaired or replaced under the conditions of this one-year warranty, please contact your dealer to make suitable arrangements.

Limitation of Liability (for all customers)

BOTH YOURS AND PIXEL MAGIC SYSTEMS' LIABILITY SHALL BE LIMITED TO THE PRICE PAID FOR PRODUCT. IN NO EVENT SHALL EITHER YOU OR PIXEL MAGIC SYSTEMS LTD. BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM PERFORMANCE OR FAILURE TO PERFORM UNDER THIS AGREEMENT, OR USE OF ANY GOODS OR SERVICE SOLD PURSUANT HERETO, WHETHER DUE TO A BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, OR OTHERWISE. NEITHER YOU NOR PIXEL MAGIC SYSTEMS LTD. SHALL HAVE ANY LIABILITY TO THE OTHER FOR INDIRECT OR PUNITIVE DAMAGES, OR FOR ANY CLAIM BY ANY THIRD PARTY EXCEPT AS EXPRESSLY PROVIDED HEREIN.

crystalio®



Website: www.crystalio.com Email: sales@pixelmagicsystems.com

DCDi® by Faroudja and TrueLife™ are registered trademarks of Genesis Microchip.
Pixel Magic System™, UltraAR™, and CrystalWall™ are trademark of Pixel Magic Systems Ltd.
All rights reserved.