

VP7configure™ User's Manual

Revision 1.6



4 Research Park Drive, St. Charles, MO 63304

Copyright© 2005 by Westar Display Technologies, Inc. All Rights Reserved.

International Copyright Secured

No part of this document may be reproduced, stored, retrieved, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without written prior permission of Westar Display Technologies, Inc., St. Charles, Missouri, USA.

This document is designed to provide accurate and authoritative information regarding the subject matter covered. However, it is provided with the understanding that users of the hardware system and/or software discussed herein have been properly trained and the system has been properly installed and configured by Westar Display Technologies, Inc. or its authorized agent. Since professional and expert assistance and training is required for safe and effective operation of the system, the services of Westar Display Technologies, Inc. should be obtained.

Although every precaution has been taken in the preparation of this document, Westar Display Technologies, Inc. assumes no responsibility for errors or omissions, nor any liability for any real or assumed damages resulting from the use of the information contained herein.

For further information, write to:

Westar Display Technologies, Inc., 4 Research Park Drive, St. Charles, MO 63304

All terms mentioned in this document that are known to be trademarks or service marks have been appropriately capitalized. Westar Display Technologies, Inc. cannot attest to the accuracy of this information. Use of a term in this document should not be regarded as affecting the validity of any trademark or service mark. Trademarks are property of their respective owners.

Westar reserves the right to change, amend, or reissue this document, or any part thereof, at its sole discretion and without further advice to any party. Any specification contained herein is subject to change without notice.

Revision Status

Rev	Release Date	Reason For Change	Update By
1.0		First Printing	RJP
1.1	12/3/04	Contrast and Brightness Control	RJP
1.2	12/21/04	Increment Delays	RJP
1.3	1/20/05	Data Mapping under output electrical, IBD	RJP
1.4	2/2/05	Name change	RJP
1.5	2/23/05	IBD change	RJP
1.6	4/1/05	Color adjust. Update, auto-detect, Int_Static	RJP

TABLE OF CONTENTS

1	System Requirements	1
2	Installation.....	1
2.1	Installing VP7configure™ for the First Time.....	1
2.2	Removing VP7configure™	1
2.3	Updating VP7configure™	1
3	Creating a Connection.....	2
4	Using the VP7configure™ Wizard.....	3
4.1	Connecting to a VP7™	3
4.1.1	Selecting a Table.....	4
4.1.2	AUTO Table Selection	4
4.2	Running the Wizard	5
4.2.1	Entering the Wizard	6
4.2.2	Moving Between Steps	6
4.3	Input Setup	7
4.3.1	Input Timing Parameters.....	8
4.3.1.1	VESA Standard.....	8
4.3.1.2	Scan Type.....	8
4.3.1.3	Vertical.....	9
4.3.1.4	Horizontal	10
4.3.2	Input Electrical.....	11
4.3.2.1	Analog RGB.....	11
4.3.2.2	TMDS	12
4.4	Output Setup	13
4.4.1	Output Sync	13
4.4.1.1	Clock.....	13
4.4.1.2	Frame Ratio.....	13
4.4.1.3	Frame Sync	14
4.4.2	Output Timing Parameters.....	14
4.4.2.1	VESA Standard.....	14

4.4.2.2	Clock.....	14
4.4.2.3	Vertical.....	15
4.4.2.4	Horizontal	16
4.4.3	Output Electrical	17
4.4.3.1	Parallel	17
4.4.3.2	LVDS	17
4.4.3.3	Data Mapping.....	17
4.4.3.4	Dual Pixel.....	17
4.4.3.5	Clock Edge.....	17
4.5	Scale and Position.....	18
4.5.1	Defining the Output Video.....	19
4.5.1.1	Area of Interest	19
4.5.1.2	Scale and Position.....	21
4.5.1.3	Fill Color.....	23
4.6	Power Sequences	24
4.6.1	Setting Power Sequences	25
	Panel Actions	26
4.6.1.1	Backlight Actions.....	26
4.6.2	Video Lost Action.....	27
4.6.2.1	Delay.....	27
4.6.2.2	Action.....	27
4.6.2.3	Field Color	27
4.7	Contrast and Brightness Control.....	28
4.7.1	Contrast Setup.....	28
4.7.1.1	Control Method.....	28
4.7.1.2	Contrast Table Editor.....	29
4.7.1.3	Power Up Value.....	29
4.7.1.4	Increment Delay Time	29
4.7.2	Brightness Setup	30
4.7.2.1	Control Method.....	30
4.7.2.2	Power Up Value.....	30

- 4.7.2.3 Increment Delay Time 30
- 4.8 Input Capture Adjustments 31
 - 4.8.1 Color Adjustments 32
 - 4.8.1.1 Black Level 32
 - 4.8.1.2 Contrast 32
 - 4.8.1.3 Brightness 32
 - 4.8.2 Timing Adjustments..... 33
 - 4.8.2.1 Sweep ADC Phase 33
 - 4.8.2.2 Input Boundary Detect..... 33
- 4.9 Applying, Saving, and Restoring Parameters 34
 - 4.9.1 Apply..... 34
 - 4.9.2 Save..... 34
 - 4.9.3 Restore 34
- 5 Saving a Connection 35**
- 6 Opening a Connection 36**
- 7 Feedback Level 36**
- 8 Contrast Tables..... 37**
 - 8.1 Contrast Table Editor 38
 - 8.1.1 Editing a Table 38
 - 8.1.2 Saving a Table..... 38
 - 8.1.3 Loading a Table 38

TABLE OF FIGURES

Figure 1 VP7configure™ Wizard.....	2
Figure 2 Connect.....	3
Figure 3 Load Settings	3
Figure 4 Disconnect	4
Figure 5 Wizard	5
Figure 6 Next, Previous	6
Figure 7 Problem Found	6
Figure 8 Input Setup.....	7
Figure 9 Progressive Scan.....	8
Figure 10 Interlaced	8
Figure 11 Vertical Timing Diagram	9
Figure 12 Horizontal Timing Diagram	10
Figure 13 Analog RGB	11
Figure 14 TMDS	12
Figure 15 Output Setup.....	13
Figure 16 Vertical Timing Diagram	15
Figure 17 Horizontal Timing Diagram	16
Figure 18 Scale and Position.....	18
Figure 19 Area of Interest	19
Figure 20 Scale and Position.....	21
Figure 21 Normal Image.....	22
Figure 22 Flipped Horizontally.....	22
Figure 23 Flipped Vertically.....	22
Figure 24 Flipped Vertically and Horizontally.....	22
Figure 25 Fill Color	23
Figure 26 Power Sequences	24
Figure 27 Power Sequence Editor.....	25
Figure 28 Video Lost Action	27
Figure 29 Contrast\Brightness Setup	28
Figure 30 Input Capture Adjustments.....	31

Figure 31 Color Adjustments..... 32

Figure 32 ADC Phase Plot..... 33

Figure 33 Apply, Save, Restore 34

Figure 34 Unsaved File..... 35

Figure 35 Saved File 35

Figure 36 Invalid Line 36

Figure 37 Contrast Table Editor 38

1 System Requirements

VP7configure™ will run on Windows 2000 or Windows XP. A COMM port is required to communicate with a VP7™ box.

2 Installation

2.1 Installing VP7configure™ for the First Time

If the PC has never had the VP7configure™ application installed, follow these steps to install the application.

STEP 1: Insert the distribution disk into the CD-ROM drive of the PC or a CD-ROM drive networked to the PC and view the contents of the CD in the Windows Explorer window.

STEP 2: Double click on “VP7CONFIGURE SETUP.EXE” file.

STEP 3: Follow the on-screen instructions to install the VP7configure™ application.

2.2 Removing VP7configure™

STEP 1: Uninstall the existing VP7configure™ application by double clicking the “Add/Remove Programs” applet in the Control Panel.

STEP 2: Select “VP7configure” from the list of programs and click the Add/Remove button.

STEP 3: Follow the on-screen instructions to uninstall the VP7configure™ application.

2.3 Updating VP7configure™

STEP 1: Remove the existing VP7configure™ application following the steps in Section 2.2.

STEP 2: Install the VP7configure™ application following the steps in Section 2.1.

3 Creating a Connection

To create a new connection to a VP7™ box, select **File->New Connection** from the menu bar, or press **Ctrl + N** on the keyboard. The VP7configure™ Wizard window will appear.

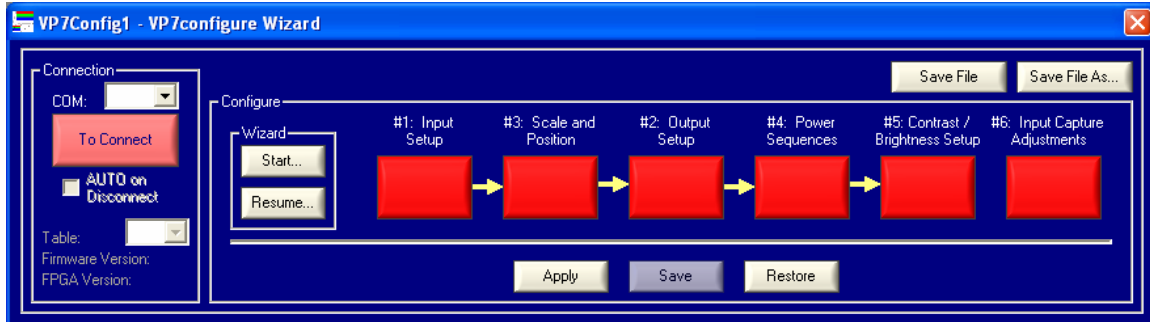


Figure 1 VP7configure™ Wizard

4 Using the VP7configure™ Wizard

The VP7configure™ Wizard performs the steps necessary to configure a VP7™ box. Its graphical user interface outlines the logical flow for setting up a VP7™. It can be used while a VP7™ is connected and changes can be applied immediately, or a file can be created, saved, and applied to a VP7™ at a later time.

4.1 Connecting to a VP7™

To connect to a VP7™, connect the RS-232 connector of the VP7™ to the RS-232 communications port on the computer. Select the COM port number from the **COM:** drop-down menu. Then click the red **To Connect** button.



Figure 2 Connect

If a VP7™ is detected, a window will appear asking “Do you want to load settings from the VP7 into the wizard?” Select **Yes** if you wish to read the settings from the VP7™, and load them into the VP7configure™ Wizard. Select **No** to retain the settings that are already in the VP7configure™ Wizard.

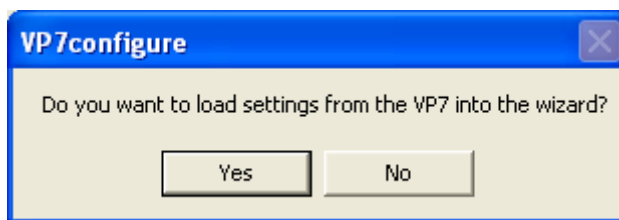


Figure 3 Load Settings

If the VP7 was in AUTO mode, it will be set to fixed mode while editing, and can then be set back to AUTO mode upon disconnecting. A message will appear indicating this.

After connecting, the button labeled “To Connect” will change to green and be labeled “To Disconnect.” The “Table” (see section 4.1.1), “Firmware Version,” and “FPGA Revision” will be shown.

To disconnect from a VP7™, click the green **To Disconnect** button.

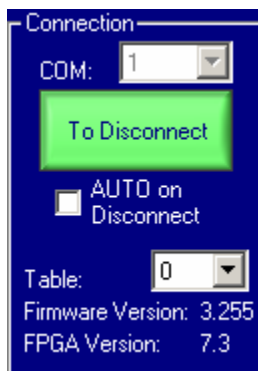


Figure 4 Disconnect

4.1.1 Selecting a Table

The VP7™ allows for 8 different “tables,” or configuration sets. Once a VP7™ is connected, the “Table” drop down list will be enabled, and the table number will be automatically selected. To change the table, click the drop down list, and select from 0 through 7. After changing the table, a window will appear asking "Do you want to load settings from the VP7 table into the wizard?" Select **Yes** if you wish to read the settings from the VP7™ table, and load them into the VP7configure™ Wizard. Select **No** to retain the settings that are already in the VP7configure™ Wizard.

4.1.2 AUTO Table Selection

The VP7™ can be set up to automatically load the table which matches the input video. A table must be created for every possible input video to use auto-mode. Using AUTO mode is not recommended when the input video is constant. AUTO mode is only supported in VP7™ firmware version 3.0 and later.

The AUTO mode currently only matches video based on the Analog RGB synchronization type (see section 4.3.2.1).

To enable AUTO mode, select **AUTO on Disconnect**. The option will have been already selected if the VP7™ was already in AUTO mode when connected. The VP7™ will be set to AUTO upon disconnecting. To disable AUTO mode, deselect **AUTO on Disconnect**, and click **To Disconnect**.

4.2 Running the Wizard

The wizard performs the following steps:

- STEP 1:* Configure input capture parameters.
- STEP 2:* Define the characteristics of the output video.
- STEP 3:* Select the area of interest of the input video. Scale and position the area of interest onto the output video.
- STEP 4:* Define the power sequences for the panel and backlight. Select the action to take when valid input video is lost.
- STEP 5:* Select methods for controlling Contrast and Brightness.
- STEP 6:* Adjust the color capture from the input video. Adjust the input capture boundary and ADC clock phase.

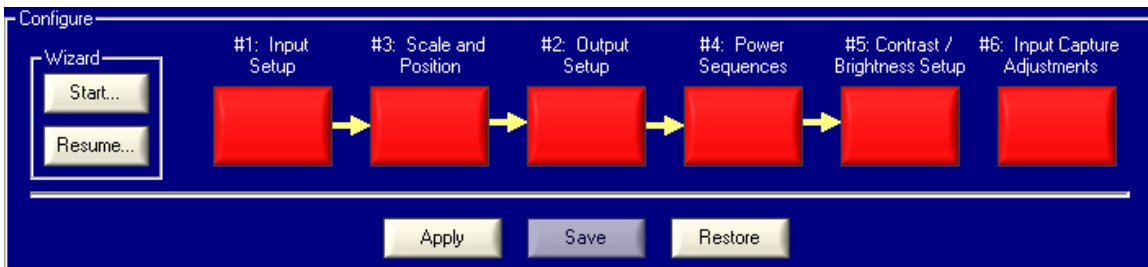


Figure 5 Wizard

4.2.1 Entering the Wizard

To begin using the wizard, click **Start...** If you have previously engaged the wizard, but closed out of the process, click **Resume...** to return to where you left off. To move directly to an individual step within the process you may click the corresponding button on the main window. While inside a step, the corresponding button will be highlighted in a yellow square. Starting at the beginning of the wizard is recommended when configuring a VP7™.

4.2.2 Moving Between Steps

To move to the next step in the wizard process, click **Next>** in the lower right hand corner of the window. To move to the previous step click **<Previous**. On the last step of the wizard, click **Finish** to leave the wizard. To leave the wizard, and discard the changes for the current step, close the window by clicking the **X** in the upper right hand corner of the window.



Figure 6 Next, Previous

The wizard validates each step after it is performed. When you click “Next>” or “<Previous,” the parameters you just entered will be checked. If they are valid, the wizard will move on, and the button corresponding to the step will turn green. If a problem is found, a message will be displayed describing the problem. It will ask, “Continue anyway?” If you select **Yes**, the wizard will move on, but the button will remain red. If you select **No**, the wizard will remain at the current step.

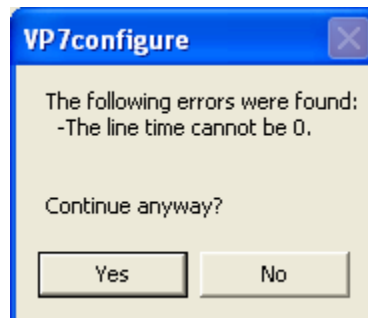


Figure 7 Problem Found

4.3 Input Setup

The parameters for capturing the input video are defined under “Input Setup.” This is the first step in the configuration process. To go directly to this step, click the button under “Step #1: Input Setup.”

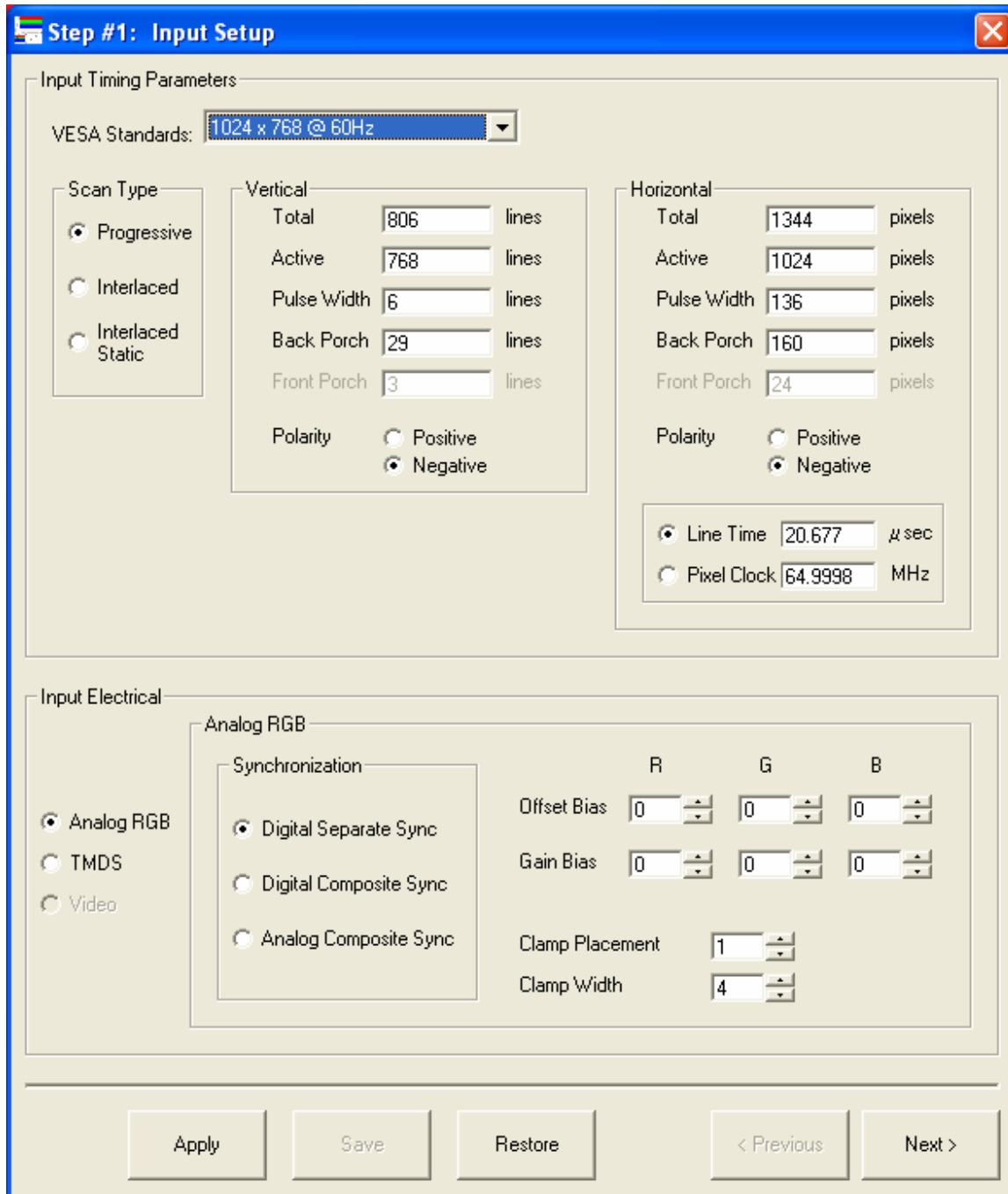


Figure 8 Input Setup

4.3.1 Input Timing Parameters

The input timing parameters are set to match the characteristics of the input video so the video data can be correctly captured. If the input parameters are changed at any time, the input adjustments will be reset to zero.

4.3.1.1 VESA Standard

There are several predefined timing specifications that can be automatically applied to the timing parameters. To use a predefined standard, click the drop-down list and select the one you wish to use. The fields in the “Input Timing Parameters” frame will be automatically filled in.

If the parameters in the fields match one of the VESA standards in the list, that standard will automatically be selected in the drop-down list. If not, **Custom** will be selected in the list.

4.3.1.2 Scan Type

Select **Progressive** if each line of input video is sent one line after the other. Select **Interlaced** if lines are sent in two interlaced fields, one containing even numbered lines and the other containing odd numbered lines. Select **Interlaced Static** if the input video is interlaced static mesh. Interlaced Static is supported in VP7™ firmware version 3.0 and later.

If the input video is interlaced, the back porch values for the odd and even lines can be different. When **Interlaced** is selected, an additional field for the even back porch value is added to the “Vertical” parameters.

Vertical

Total lines

Active lines

Pulse Width lines

Back Porch lines

Front Porch lines

Polarity Positive
 Negative

Figure 9 Progressive Scan

Vertical

Total lines

Active lines

Pulse Width lines

Back Porch

Odd lines

Even lines

Front Porch

Odd lines

Even lines

Polarity Positive
 Negative

Figure 10 Interlaced

4.3.1.3 Vertical

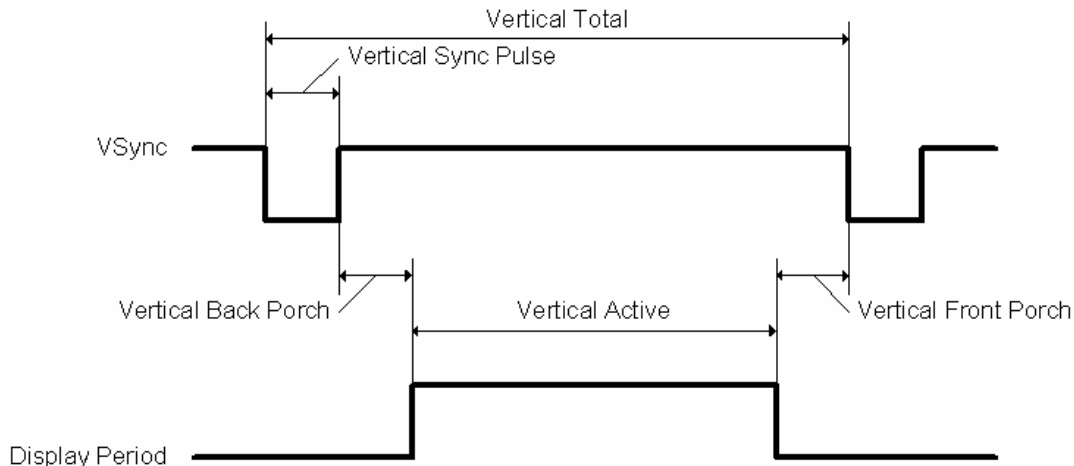


Figure 11 Vertical Timing Diagram

Total

Vertical Total defines the total number of lines of input video, including blanking.

Active

Vertical Active defines the number of active or visible lines of input video.

Pulse Width

Vertical Pulse Width defines the width of the vertical sync pulse in lines.

Back Porch

Vertical Back Porch defines the number of lines between the end of the vertical sync pulse and the beginning of active video. If **Progressive** is selected as the scan type, only “Back Porch” is used. If **Interlaced** is selected, “Back Porch Odd” defines the back porch for the odd fields, and “Back Porch Even” defines the back porch for the even fields.

Front Porch

Vertical Front Porch defines the number of lines between the end of active video and the beginning of the vertical sync pulse. It is calculated automatically when a vertical timing parameter changes, and cannot be set. If **Progressive** is selected as the scan type, only “Front Porch” is shown. If **Interlaced** is selected, “Front Porch Odd” shows the front porch for the odd fields, and “Front Porch Even” shows the front porch for the even fields.

Polarity

Vertical Polarity defines the polarity of the vertical sync pulse. Select **Positive** if the pulse is active high and **Negative** if the pulse is active low.

4.3.1.4 Horizontal

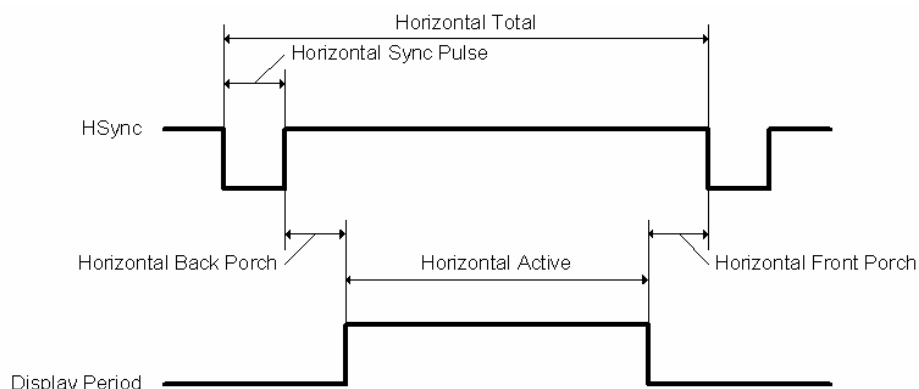


Figure 12 Horizontal Timing Diagram

Total

Horizontal Total defines the total number of pixels in one line of input video, including blanking.

Active

Horizontal Active defines the number of active or visible pixels of one line of input video.

Pulse Width

Horizontal Pulse Width defines the width of the horizontal sync pulse in pixels.

Back Porch

Horizontal Back Porch defines the number of pixels between the end of the horizontal sync pulse and the beginning of active video.

Front Porch

Horizontal Front Porch defines the number of lines between the end of active video and the beginning of the horizontal sync pulse. It is calculated automatically when a horizontal timing parameter changes, and cannot be set.

Polarity

Horizontal Polarity defines the polarity of the horizontal sync pulse. Select **Positive** if the pulse is active high, and **Negative** if the pulse is active low.

Line Time or Pixel Clock

The capture rate can either be defined by line time or the pixel clock rate. Select line time by clicking the **Line Time** option or pixel clock by selecting the **Pixel Clock** option. “Line Time” defines the time that it takes to scan one line of video. Its units are microseconds (μsec). “Pixel Clock” defines the rate that pixels are scanned. Its units are megahertz (MHz).

4.3.2 Input Electrical

The input electrical parameters define the format of the input video. There are three choices for video formats selectable by radio buttons: **Analog RGB**, **TMDS**, and **Video**. When a format is selected, the fields to the right of the choices will change to match the selected format. (*NOTE* “Video” is not supported yet, and its button is disabled.)

4.3.2.1 Analog RGB

Select **Analog RGB** if the input video format is analog RGB. Complete the fields to the right to configure the analog to digital converter.

Figure 13 Analog RGB

Synchronization

Select **Digital Separate Sync** if the horizontal and vertical synchronization signals are separate. Select **Digital Composite Sync** if the horizontal and vertical synchronization signals are combined into one signal. Select **Analog Composite Sync** (sync on green) if the horizontal and vertical synchronization signals are combined on the green video signal.

Offset Bias

The offset biases are added to the calibration values that eliminate the DC offset from the analog video signals. Each color component (R, G, and B) has an offset bias.

Gain Bias

The gain biases are added to the calibration values that aligns the full analog RGB range of the analog video signals. Each color component (R, G, and B) has a gain bias.

Clamp Placement

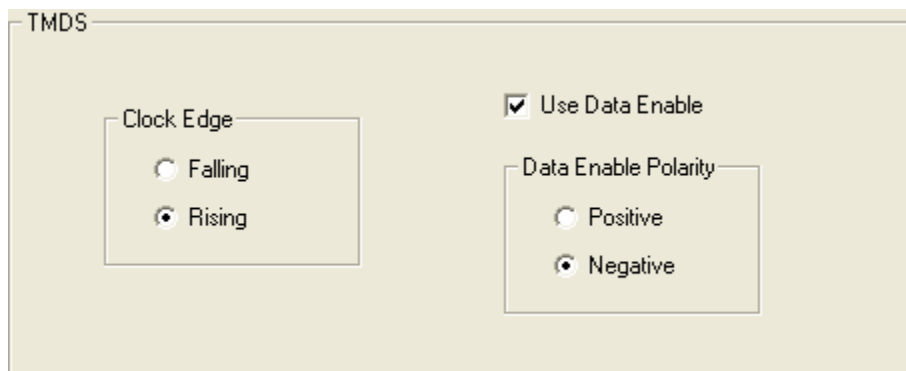
“Clamp Placement” defines the starting position after a horizontal sync pulse when the input analog signal is clamped for DC restoration. It is programmed in increments of eight input clock edges. In most cases, the clamp placement can be set to “1.”

Clamp Width

“Clamp Width” defines the interval that the input analog signal is clamped for DC restoration. It is programmed in increments of eight input clock edges. In most cases, the clamp width can be set to “4.”

4.3.2.2 TMDS

Select **TMDS** if the input video format is TMDS.



The screenshot shows a configuration window titled "TMDS". Inside the window, there are two main sections. The first section is "Clock Edge", which contains two radio button options: "Falling" and "Rising". The "Rising" option is selected. The second section is "Data Enable", which contains a checked checkbox labeled "Use Data Enable" and a sub-section titled "Data Enable Polarity" with two radio button options: "Positive" and "Negative". The "Negative" option is selected.

Figure 14 TMDS

Clock Edge

Select **Falling** if pixel data is latched on the falling edge of the input clock. Select **Rising** if pixel data is latched on the rising edge of the input clock.

Use Data Enable

Select the option **Use Data Enable** to use the data enable signal to qualify active data. De-select the option to identify active data arbitrarily within the line.

Data Enable Polarity

Select **Positive** if active data is present when the data enable signal is high. Select **Negative** if active data is present when the data enable signal is low.

4.4 Output Setup

The parameters for the output video are configured under “Output Setup.” This is the second step in the configuration process. To go directly to this step, click the button under “Step #2: Output Setup.”

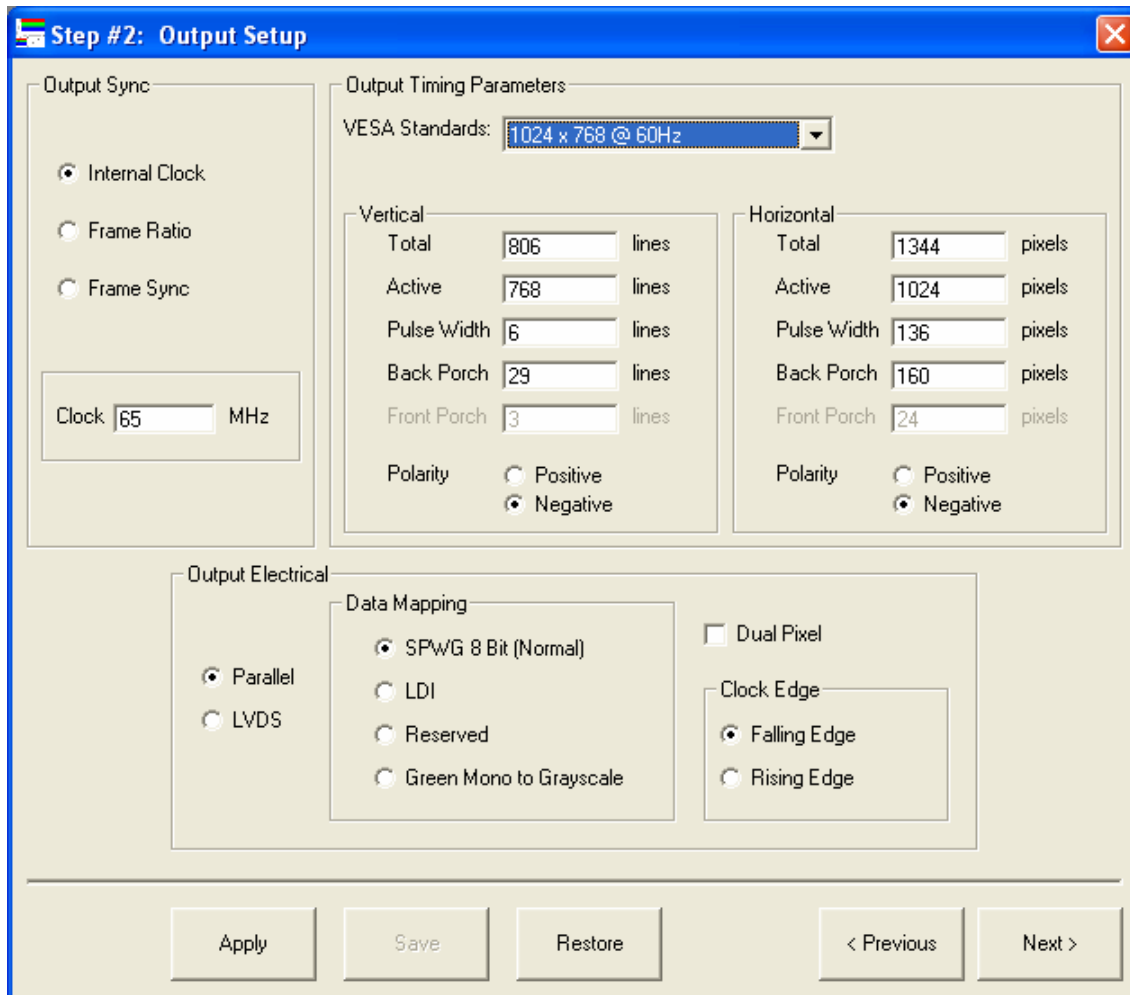


Figure 15 Output Setup

4.4.1 Output Sync

4.4.1.1 Clock

Select **Clock** to use an internally generated output clock to generate the output video.

4.4.1.2 Frame Ratio

Select **Frame Ratio** to synchronize the output video to the input video at a certain ratio of frames. For every number of frames of input video, there can be a certain number of frames output. When using “Frame Ratio,” the pixel clock of the output video is adjusted to satisfy the ratio. Enter the number of input frames into **In Frames**, and the number of output frames into **Out Frames**.

4.4.1.3 Frame Sync

Select **Frame Sync** to synchronize the refresh rate of the output video to that of the input video. One output frame is generated for every input frame and a constant phase relationship exists between the output and input frames such that no video data is lost. There will be limits to this feature. At this time, we cannot guarantee the output timing parameters.

4.4.2 Output Timing Parameters

The output timing parameters define the timing characteristics of the output video.

4.4.2.1 VESA Standard

There are several predefined timing specifications that can be automatically applied to the timing parameters. To use a predefined standard, click the drop-down list and select the one you wish to use. The fields in the “Output Timing Parameters” frame will be filled in automatically.

If the parameters in the fields match one of the VESA standards in the list, that standard will automatically be selected in the drop-down list. If not, **Custom** will be selected in the list.

4.4.2.2 Clock

The “Clock” field sets the rate of the output video clock, or how quickly each pixel datum is sent out.

4.4.2.3 Vertical

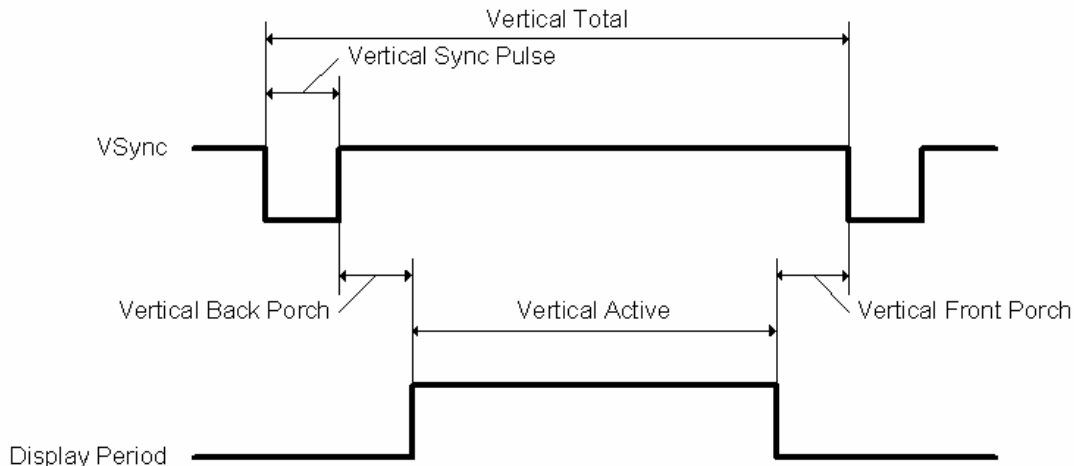


Figure 16 Vertical Timing Diagram

Total

Vertical Total defines the total number of lines of output video, including blanking.

Active

Vertical Active defines the number of active or visible lines of output video.

Pulse Width

Vertical Pulse Width defines the width of the vertical pulse in lines.

Back Porch

Vertical Back Porch defines the number of lines between the end of the vertical sync pulse and the beginning of active video.

Front Porch

Vertical Front Porch defines the number of lines between the end of active video and the beginning of the vertical sync pulse. It is calculated automatically when a vertical timing parameter changes, and cannot be set.

Polarity

Vertical Polarity defines the polarity of the vertical sync pulse. Select **Positive** if the pulse is active high and **Negative** if the pulse is active low.

4.4.2.4 Horizontal

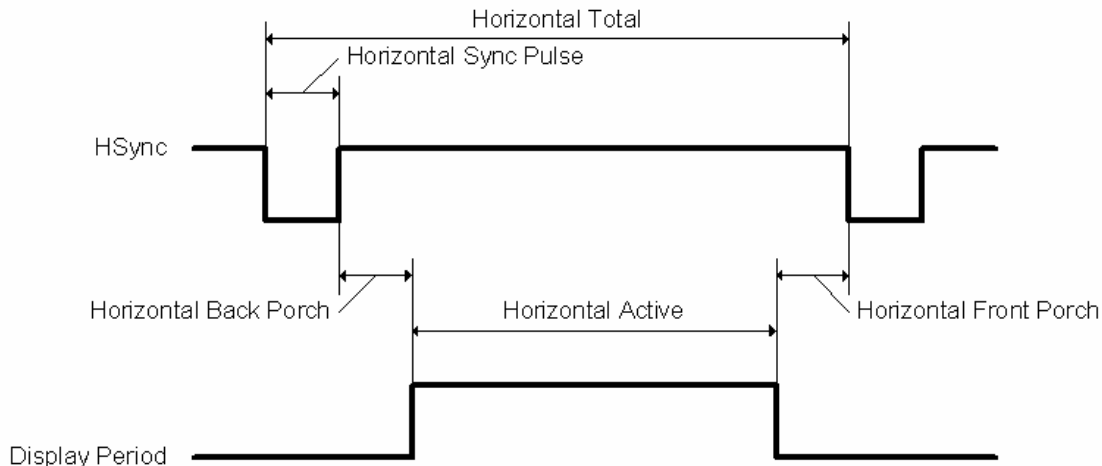


Figure 17 Horizontal Timing Diagram

Total

Horizontal Total defines the total number of pixels in one line of output video, including blanking.

Active

Horizontal Active defines the number of active or visible pixels of one line of output video.

Pulse Width

Horizontal Pulse Width defines the width of the horizontal sync pulse in pixels.

Back Porch

Horizontal Back Porch defines the number of pixels between the end of the horizontal sync pulse and the beginning of active video.

Front Porch

Horizontal Front Porch defines the number of lines between the end of active video and the beginning of the vertical sync pulse. It is calculated automatically when a horizontal timing parameter changes, and cannot be set.

Polarity

Horizontal Polarity defines the polarity of the horizontal sync pulse. Select **Positive** if the pulse is active high and **Negative** if the pulse is active low.

4.4.3 Output Electrical

“Output Electrical” defines the format of the output video.

4.4.3.1 Parallel

Select **Parallel** if the output video format is parallel.

4.4.3.2 LVDS

Select **LVDS** if the output video format is LVDS (Low Voltage Different Signal).

4.4.3.3 Data Mapping

The output video data signals can be mapped in different fashions. Select **SPWG 8-bit (Normal)** to use the SPWG configuration. This configuration is also the mapping to use for normal parallel output. Select **LDI** to use the LDI configuration. **Reserved** is reserved for future mappings. Select **Green Mono to Grayscale** to use the green input video signal to produce monochrome output.

4.4.3.4 Dual Pixel

Select **Dual Pixel** if the display being driven requires dual pixel video.

4.4.3.5 Clock Edge

Select Falling Edge to output pixel data on the falling edge of the output clock. Select Rising Edge to output pixel data on the rising edge of the output clock.

4.5 Scale and Position

The “Scale and Position” step configures the parameters that define the video I/O relationship. It has support for selecting, scaling and positioning an area of interest (AOI) from the input video onto the output video.

This is the third step in the configuration process. To go directly to this step, click the button under “Step #3: Scale and Position.”

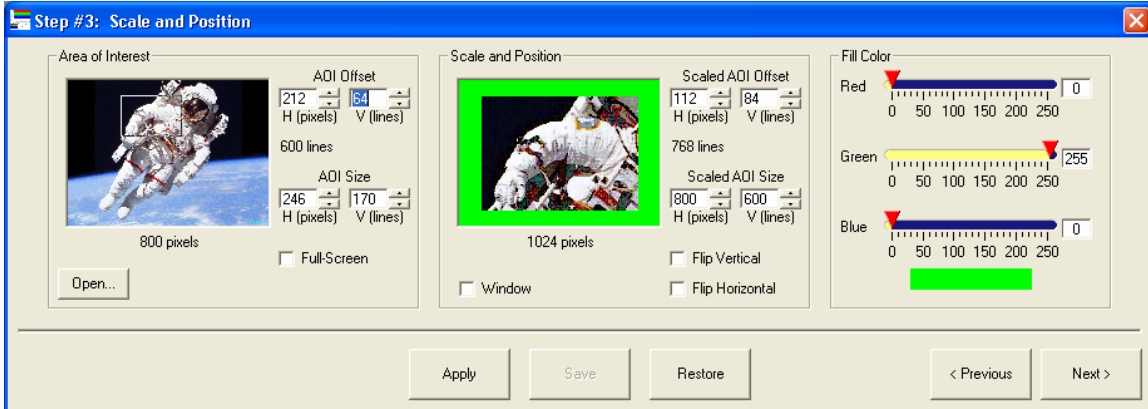


Figure 18 Scale and Position

4.5.1 Defining the Output Video

There are three steps in defining the content of the output video. First, select an area of interest (AOI) from the active area of the input video. Second, scale and position the AOI into the active area of the output video. Third, define the color to be used to fill any of the output active area that is not covered by the scaled and positioned AOI.

4.5.1.1 Area of Interest

The area of interest in the input video (AOI) is selected in the “Area of Interest” frame. The main window for selecting the AOI is proportional to the active area of the input video.

The area of interest is selected by entering the offset and size, or selecting it within the “Area of Interest” window. The AOI cannot go outside of the active area of the input video.

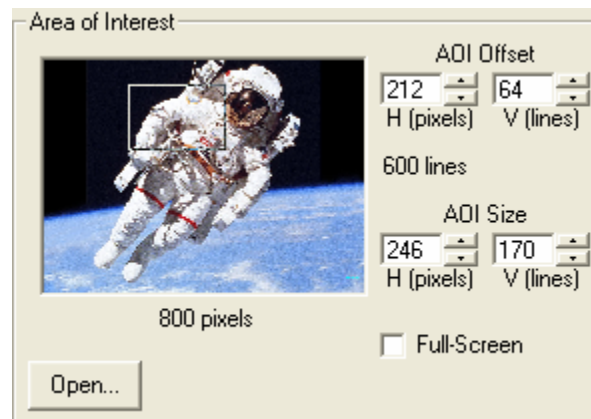


Figure 19 Area of Interest



Entering the AOI Offset

The offset of the AOI can be entered using the **AOI Offset** fields. The vertical offset is the number of lines from the top of the input active area to begin the area of interest. The horizontal offset is the number of pixels from the left of the input active area to begin the area of interest. When these fields are changed, the position of the box in the “Area of Interest” window also changes.

Entering the AOI Size

The size of the area of interest can be entered using the **AOI Size** fields. The vertical size is the number of lines in the AOI, and the horizontal size is the number of pixels in the area of interest. When these fields are changed, the size of the box in the “Area of Interest” window also changes.

Selecting the Area of Interest in the Window

Within the “Area of Interest” window, the box can be moved and sized which coarsely selects the area of interest. To move the box with the mouse, move the cursor inside the box, and the cursor will change into a “grabber” . Click and hold the mouse button and the cursor will change into a “dragger” . The box can then be dragged around within the window. To change the size of the box, move the cursor to the border of the box, and the cursor will change into an arrow indicating the directions that the size can be changed in. Click and drag to change the size. When the box is moved, the “AOI” size and offset fields are updated.

Full Screen

To force the area of interest to be the entire input active area, select the option **Full Screen**. When the area of interest is sized to be full screen, the option will be automatically selected.

Preview Image

A “preview image” can be used to represent an input source and show how the resulting output may appear. To use an image select the button labeled **Open...** and an “Open Picture” window will appear. A picture file with the extension “.bmp,” “.jpg,” or “.gif” may be used. If a picture is not chosen, a default image is used. When a change is made in the AOI or scale and position (see section 4.6.1.2), the image in the windows will be redrawn accordingly.

4.5.1.2 Scale and Position

The scale and position of the area of interest (Scaled AOI) is set in the “Scale and Position” frame. The window for setting the scaled AOI is proportional to the active area of the output.

The scaled AOI is set by entering the offset and size, or setting it within the “Scale and Position” window. The scaled AOI cannot go outside the output active area. The minimum vertical size of the scaled AOI is one half of the area of interest size plus one line. The minimum horizontal size of the scaled AOI is one half of the area of interest size plus one pixel.

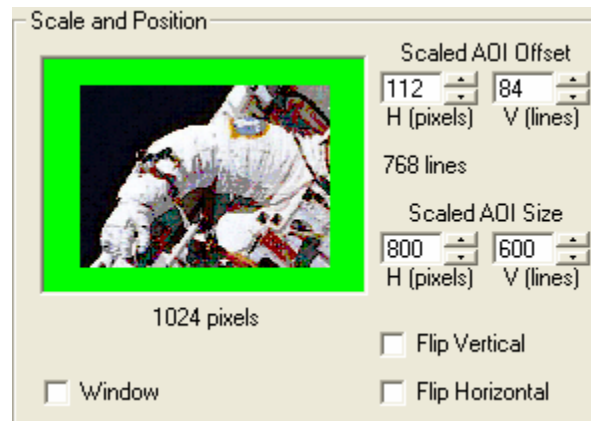


Figure 20 Scale and Position



Entering the Scaled AOI Offset

The offset of the scaled AOI can be entered using the **Scaled AOI Offset** fields. The vertical offset is the number of lines from the top of the output active area. The horizontal offset is the number of pixels from the left of the output active areas. When these fields are changed, the position of the picture in the “Scale and Position” window also changes.

Entering the Scaled AOI Size

The size of the scaled AOI can be entered using the **Scaled AOI Size** fields. The vertical size is the number of lines in the scaled AOI, and the horizontal size is the number of pixels in the scaled AOI. When these fields are changed, the size of the picture in the “Scale and Position” window also changes.

Setting the Scaled AOI in the Window

Within the “Scaled AOI” window, the picture can be moved and sized which coarsely sets the scaled AOI. To move the picture with the mouse, move the cursor inside the picture, and the cursor will change into a “grabber” . Click and hold the mouse button and the cursor will change into a “dragger” . The picture can then be dragged around within the window. To change the size of the picture, move the cursor to the border of the picture, and the cursor will change into an arrow indicating the directions that the size can be changed. Click and drag to change the size. When the picture is moved, the “Scaled AOI” size and offset fields are updated.

Window Scaled AOI

To force the scaled AOI size and offset to match the AOI, select the option **Window**. If the scaled AOI is sized and positioned to match the AOI, the option will be selected automatically.

Flip Scaled AOI

The scaled AOI can be flipped vertically or horizontally as part of the output video. To flip the scaled AOI vertically, select the **Flip Vertical** option. To flip the scaled AOI horizontally, select the **Flip Horizontal** option.



Figure 21 Normal Image

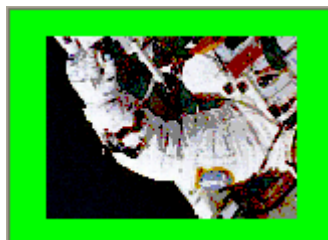


Figure 23 Flipped Vertically



Figure 22 Flipped Horizontally

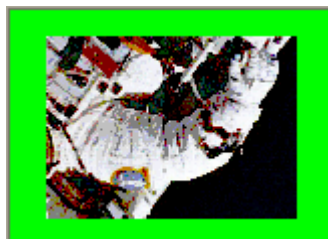


Figure 24 Flipped Vertically and Horizontally

4.5.1.3 Fill Color

A solid color is used to fill the rest of the output video. The color is set using “Fill Color.” Select the color using the sliders, or entering a value from 0 to 255 for each color component (RGB). The color will be shown in the in “Scale and Position” window.

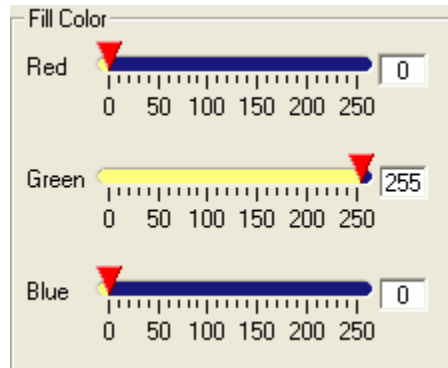


Figure 25 Fill Color

4.6 Power Sequences

Power sequences for the display and backlight being driven, and the action to take when loss of video is detected are setup in the “Power Sequences” step. This is the fourth step in the configuration process. To go directly to this step, click the button under “Step #4: Power Sequences.”

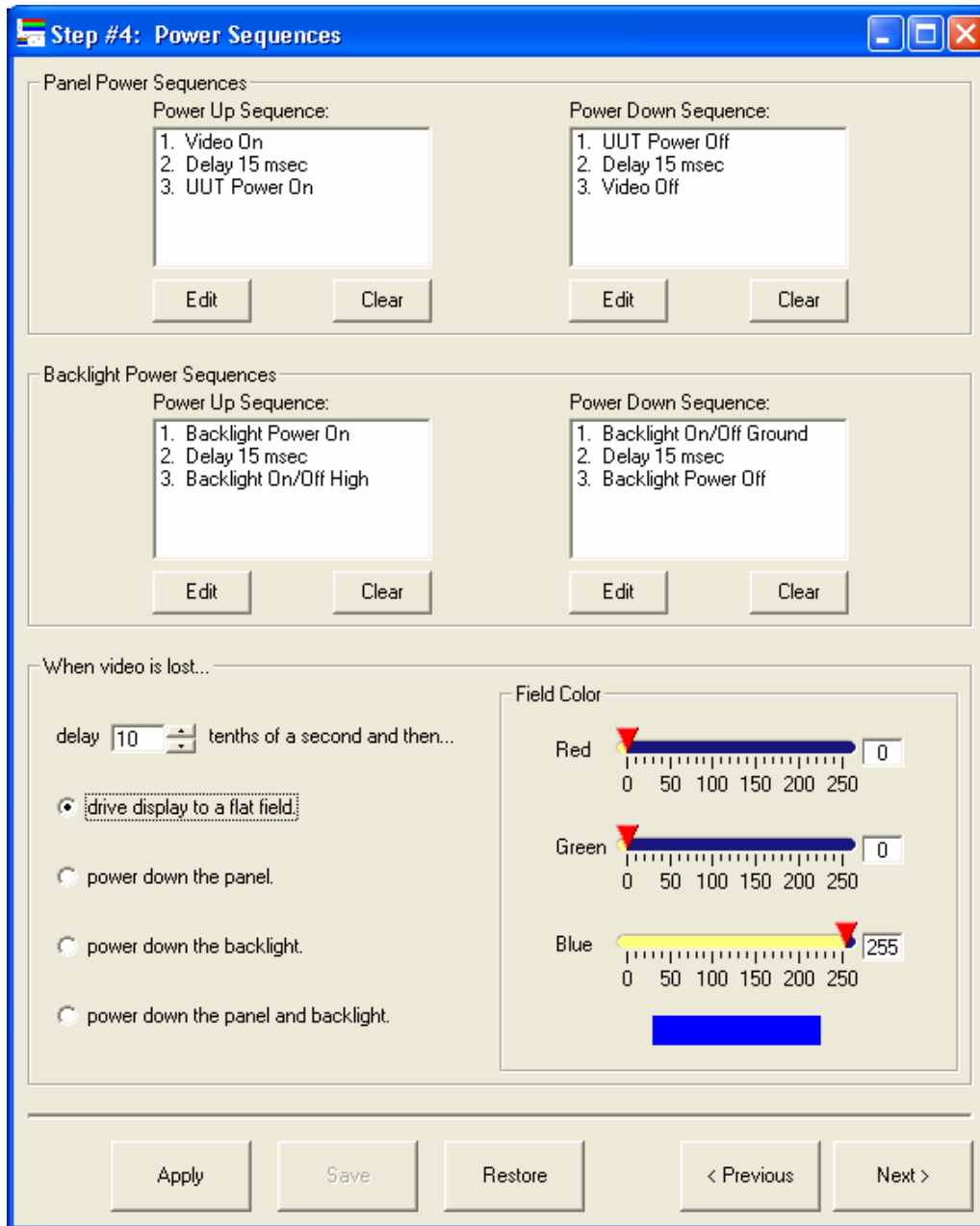


Figure 26 Power Sequences

4.6.1 Setting Power Sequences

The sequence of events to turn on and off the panel and backlight are set up under “Panel Power Sequences” and “Backlight Power Sequences.” The sequences for the panel and backlight are set up separately, with a sequence to power up and power down.

To edit a sequence, click **Edit** under the sequence type of sequence. An editor window will then appear.

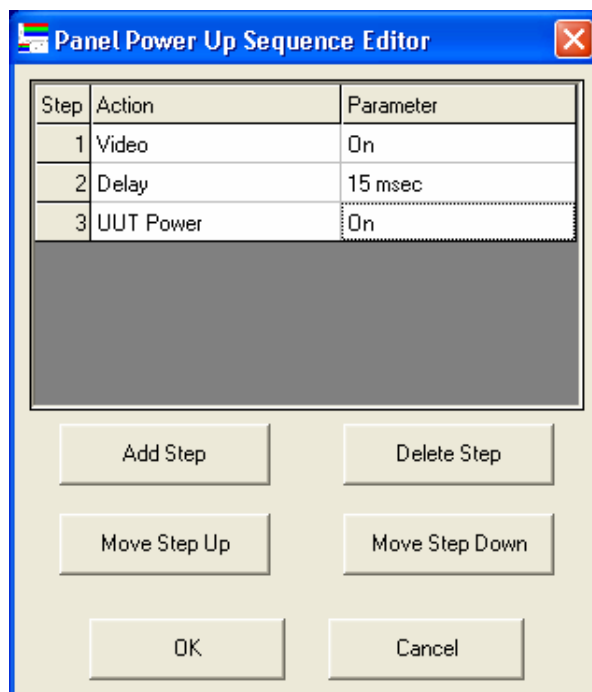


Figure 27 Power Sequence Editor

To add a new step to the sequence, click **Add Step**. To define a step, first click the cell under “Action” for the step you are editing, and select an action from the list. There are different options for “Action” depending on whether it is a panel or backlight power sequence. Once the action is selected, select the “Parameter” by clicking the cell and selecting a parameter from the drop-down list. If the action is “Delay,” enter the delay time in the cell.

To move a step up in the order, select the step and click **Move Step Up**. To move a step down, click **Move Step Down**. To delete a step, select the step and click **Delete Step**. Once editing is completed, click **OK**. To cancel editing and discard any changes, click **Cancel**.

After exiting the edit window, the sequence will be shown in the box above the “Edit” button. To clear the sequence, click **Clear**.

Panel Actions

Action	Description	Parameter
UUT Power	Power to the panel being driven	ON, OFF
Video	Video to the panel being drive	ON, OFF
Discrete 0	Discrete output voltage	HIGH, GROUND
Discrete 1	Discrete output voltage	HIGH, GROUND
Discrete 2	Discrete output voltage	HIGH, GROUND
Discrete 3	Discrete output voltage	HIGH, GROUND
Discrete 4	Discrete output voltage	HIGH, GROUND
Discrete 5	Discrete output voltage	HIGH, GROUND
Discrete 6	Discrete output voltage	HIGH, GROUND
Discrete 7	Discrete output voltage	HIGH, GROUND
Power Supply 0	Discrete output voltage to power supply	HIGH, GROUND
Power Supply 1	Discrete output voltage to power supply	HIGH, GROUND
Power Supply 2	Discrete output voltage to power supply	HIGH, GROUND
Power Supply 3	Discrete output voltage to power supply	HIGH, GROUND
Delay	Delay for time	Time (msec)

4.6.1.1 Backlight Actions

Action	Description	Parameter
Backlight Power	Power to the backlight being driven	ON, OFF
Backlight On/Off	Discrete to turn on/off the backlight	HIGH, GROUND
Discrete 0	Discrete output voltage	HIGH, GROUND
Discrete 1	Discrete output voltage	HIGH, GROUND
Discrete 2	Discrete output voltage	HIGH, GROUND
Discrete 3	Discrete output voltage	HIGH, GROUND
Discrete 4	Discrete output voltage	HIGH, GROUND
Discrete 5	Discrete output voltage	HIGH, GROUND
Discrete 6	Discrete output voltage	HIGH, GROUND
Discrete 7	Discrete output voltage	HIGH, GROUND
Delay	Delay for time	Time (msec)

4.6.2 Video Lost Action

When the loss of valid input video is detected, the power down sequence of the panel and/or backlight can be run, or the display can be driven to a flat color field.

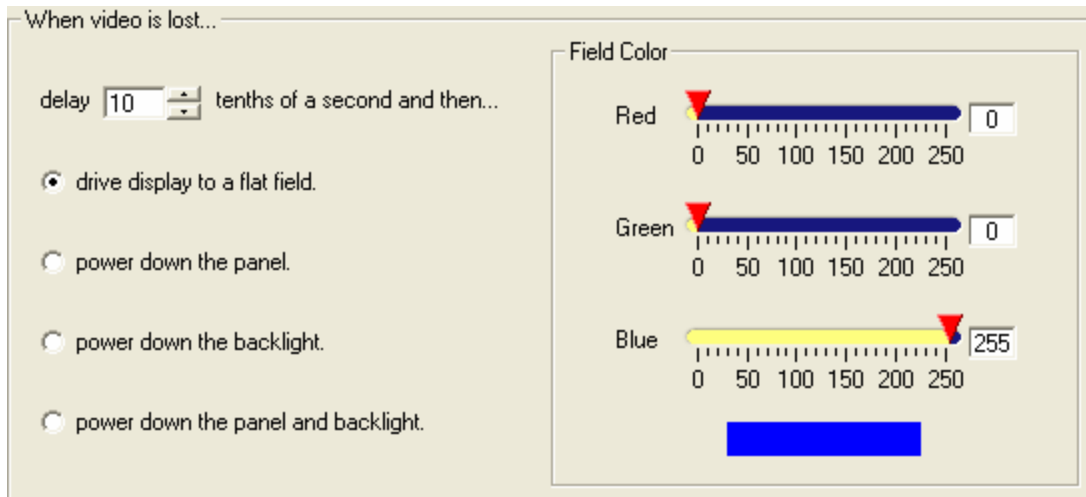


Figure 28 Video Lost Action

4.6.2.1 Delay

To delay an action after video is lost, enter the delay time in tenths of seconds into **delay**.

4.6.2.2 Action

Select the action to take by clicking on the corresponding button. Select **drive display to flat field** to drive the display to a solid color indicated by “Field Color.” Select **power down the panel** to run the panel power down sequence. Select **power down the backlight** to run the backlight power down sequence. Select **power down the panel and backlight** to run the panel and backlight power down sequences.

4.6.2.3 Field Color

If you selected “drive display to flat field,” select the color under “Field Color.” Select the color using the sliders, or entering a value from 0 to 255 for each color component (RGB).

4.7 Contrast and Brightness Control

The parameters for manually controlling the contrast and brightness of the display being driven are set up under “Contrast\Brightness Control.” This is the fifth step in the configuration process. To go directly to this step, click the button under “Step #5: Output Setup.”

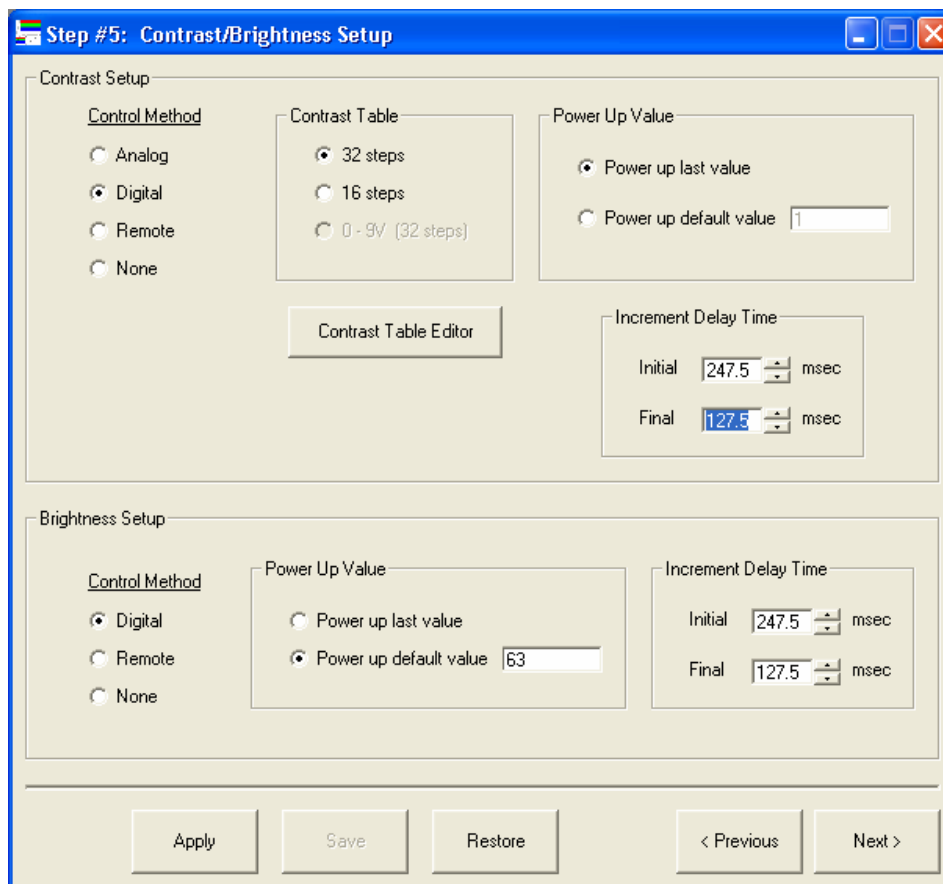


Figure 29 Contrast\Brightness Setup

4.7.1 Contrast Setup

The method of contrast control and the “Contrast Table” to use are selected under “Contrast Setup.” (See section 7 for more about the Contrast Tables).

4.7.1.1 Control Method

Select the method of manually controlling the contrast under “Control Method.”

Analog

Select **Analog** to use the analog input to the VP7 as the control.

If “Analog” is selected, the options under “Contrast Table” will change. Select between - **9 to 9V (32 steps), 0 to 5V (16 steps), 0 to 9V (32 steps)**.

Digital

Select **Digital** to use the digital contrast control.

If “Digital” is selected, the options under “Contrast Table” will change. Select between **32 step** and **16 steps**.

Remote

Select **Remote** to use remote commands to control the contrast.

None

Select **None** if you do not wish to manually control the contrast. The contrast will be set to the value made under “Color Adjustments” (section 4.8.1).

4.7.1.2 Contrast Table Editor

Click **Contrast Table Editor** to launch the “Contrast Table Editor” (see section 7.1).

4.7.1.3 Power Up Value

The “Power Up Value” is the step that the contrast is set to when the board is powered up. This is only used if the digital control is used.

Power Up Last Value

Select **Power Up last value** to have the board remember the last contrast step when it was last powered down.

Power Up Default Value

Select **Power Up default value** to have the board power up with the same contrast step every time. Enter the value into the box beside the option. The range for the value is 1 to 32 if Table 1 is used, and 1 to 16 if Table 2 is used.

4.7.1.4 Increment Delay Time

“Increment Delay Time” sets how quickly the contrast step is incremented when the digital control is held down. The delay time is the time between each increment.

Initial

The “Initial” delay is the time between each increment during the first four steps, as the digital control is held down. The time can range from 0 to 1912.5 microseconds.

Final

The “Initial” delay is the time between each increment after four steps, as the digital control is held down. The time can range from 0 to 1912.5 microseconds.

4.7.2 Brightness Setup

The method of brightness control and the brightness value to use at power up are selected under “Brightness Setup.”

4.7.2.1 Control Method

Select the method of manually controlling the brightness under “Control Method.”

Digital

Select **Digital** to use the digital brightness control.

Remote

Select **Remote** to use remote commands to control the brightness.

None

Select **None** if you do not wish to manually control the brightness.

4.7.2.2 Power Up Value

The “Power Up Value” is the value that the brightness is set to when the board is powered up.

Power Up Last Value

Select **Power Up last value** to have the board remember the last brightness value when it was last powered down.

Power Up Default Value

Select **Power Up default value** to have the board power up with the same brightness value every time. Enter the value into the box beside the option. The range for the value is 0 to 63.

4.7.2.3 Increment Delay Time

“Increment Delay Time” sets how quickly the brightness is incremented when the digital control is held down. The delay time is the time between each increment.

Initial

The “Initial” delay is the time between each increment during the first four steps, as the digital control is held down. The time can range from 0 to 1912.5 microseconds.

Final

The “Initial” delay is the time between each increment after four steps, as the digital control is held down. The time can range from 0 to 1912.5 microseconds.

4.8 Input Capture Adjustments

Adjustments are made to the input ADC sampling clock phase and capture boundaries during the “Input Capture Adjustments” step. Also, adjustments to the color of the captured input video can be made. This is the sixth and final step in the configuration process. To go directly to this step, click the button under “#6: Input Capture Adjustments.”

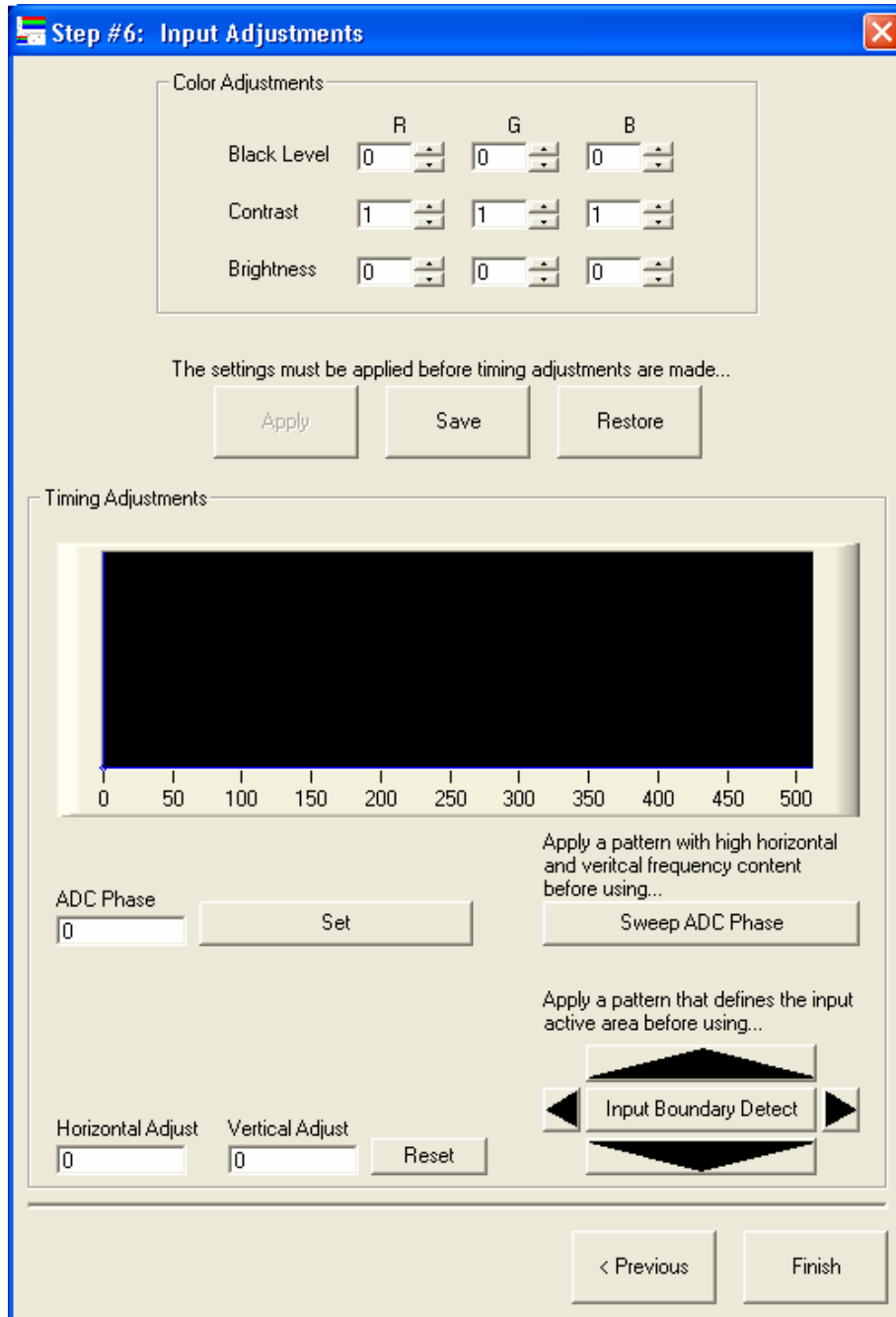


Figure 30 Input Capture Adjustments

4.8.1 Color Adjustments

Adjustments to the color of the input source can be made under “Color Adjustments.” Three adjustments can be made: **Black Level**, **Contrast**, and **Brightness**. The adjustments are done for each color component, RGB, separately. Enter the adjustments in the fields under “R,” “G,” and “B,” or click on the up and down arrows.

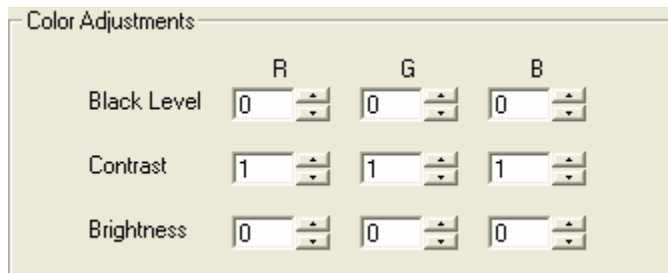


Figure 31 Color Adjustments

4.8.1.1 Black Level

The **Black Level** value is subtracted from the color data from the input source. The default value is “0.” It can range from 0 to 255.

4.8.1.2 Contrast

Color data from the input source is multiplied by the **Contrast** value. The default value is “1.” It can range from 0 to 1.998.

4.8.1.3 Brightness

The **Brightness** value is added to the color data from the input source. The default value is “0.” It can range from 0 to 255.

When used in conjunction, the color adjustments follow the following equations:

$$R(\text{out}) = (R - \text{RedBlackLevel}) * \text{RedContrast} + \text{RedBrightness}$$

$$G(\text{out}) = (G - \text{GreenBlackLevel}) * \text{GreenContrast} + \text{GreenBrightness}$$

$$B(\text{out}) = (B - \text{BlueBlackLevel}) * \text{BlueContrast} + \text{BlueBrightness}$$

The black level is applied first, followed by contrast, and then brightness.

4.8.2 Timing Adjustments

To use the timing adjustments, a valid video source must be connected to the video input. It is recommended that the video output also be connected so the adjustments can be seen. Before making timing adjustments, all the parameters must be applied. If the parameters have not been applied, the adjustments will be disabled. Also, if a VP7™ is not connected, the timing adjustments will be disabled.

4.8.2.1 Sweep ADC Phase

Click **Sweep ADC Phase** to run a test of different phase delays of the analog to digital converter sampling clock. The process takes several minutes to complete. When using the test, apply a pattern with high horizontal and vertical frequency content as the source, or a “busy” image.

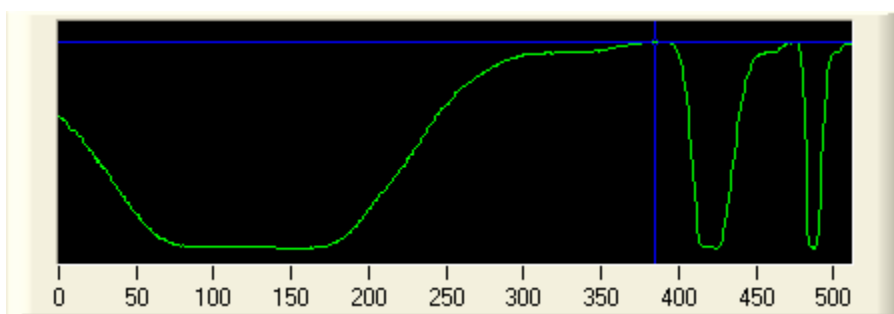


Figure 32 ADC Phase Plot

The phase delay is varied over a range of 0 to 511. For each delay, the sum of differences of consecutive pixel data is measured and plotted in the graph. As the test progresses, the delay that yields the highest difference is tracked. The best delay to choose corresponds to the peak of the widest sum of difference cycle.

To stop the testing at any time, click **STOP**.

After the test has been run, the delay that yields highest difference is applied. The phase delay can also be selected manually by clicking on the graph or entering it into **ADC Phase**. Click **Set** to program the delay if you wish to set it manually.

4.8.2.2 Input Boundary Detect

Clicking **Input Boundary Detect** adjusts the input capture area so the entire area is captured correctly. When running the “Input Boundary Detect,” apply a pattern that defines the input active area as set up in Step #1: Input Setup. When it completes, if the pattern did not appear to define the input active area, a message will appear.

To manually adjust the input boundary, click any of the arrow buttons surrounding the “Input Boundary Detect” button. The input boundary will shift in the opposite direction of the arrow, causing the output image to shift in the direction of the arrow. As the image is adjusted, the offsets are shown in “Horizontal Adjust” and “Vertical Adjust.” To reset the adjustments to zero, click **Reset**.

4.9 Applying, Saving, and Restoring Parameters

The **Apply**, **Save**, and **Restore** buttons appear at every step of the wizard at the bottom of the window, and in the VP7configure™ Wizard window. To use any of the buttons, a VP7™ must be connected. If one is not connected, an error message will appear if any of the buttons are clicked.

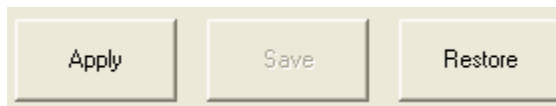


Figure 33 Apply, Save, Restore

4.9.1 Apply

Clicking **Apply** sends all the parameters to the volatile memory of the VP7™, and applies them. If there is a problem with one of the parameters, a message box will appear saying which set of parameters has a problem. The parameters will not be applied if there is an error.

After the “Apply” is done, the **Apply** button will be disabled and the **Save** button will be enabled. **Apply** will be enabled again when there is a change to one of the parameters, and **Save** will be disabled.

4.9.2 Save

Clicking **Save** stores the parameters for the VP7™ channel. The parameters that are in memory are copied into non-volatile memory, so the VP7™ channel can remember the parameters the next time it is powered down.

When the **Apply** button is enabled, meaning there is unapplied changes to the parameters, the **Save** button is disabled. The **Save** button is enabled after the current parameters are successfully applied to the VP7™ channel.

4.9.3 Restore

Clicking **Restore** reads back the parameters stored in nonvolatile memory of the VP7™ channel into volatile memory. The parameters are then reapplied and read into the VP7configure™ program. This can be used to discard recent changes and return to the last saved state.

5 Saving a Connection

Files are saved as text files (*.txt) containing VP7™ text commands.

To save a set of parameters to the PC, select **File->Save** from the menu, click the **Save** button in the VP7configure™ Wizard window, or press **Ctrl + S** on the keyboard. If you haven't saved the connection before, it will ask for a text file name. You may enter a new name, or replace an existing file. If you have saved already, it will not ask for a file name and save it under the same name.

After a file is saved, the file name will be displayed in the title bar of the VP7configure™ Wizard window. Before it is saved, it is given a default name.



VP7Config1 - VP7 Configure Wizard

Figure 34 Unsaved File



VP7Config1.txt - VP7 Configure Wizard

Figure 35 Saved File

To save an already saved connection under a different file name, select **File->Save As...** from the menu, or click the **Save As...** button in the VP7configure™ Wizard window. The program will then prompt for a text file name to save under.

6 Opening a Connection

Text files containing VP7™ commands or files saved by VP7configure™ can be opened and loaded into the VP7configure™ Wizard.

To open an existing file, select **File->Open Connection** from the menu or press **Ctrl + O** on the keyboard. Choose the text file (*.txt) you wish to open.

VP7configure™ checks each line in the file, and, if it is a valid VP7™ command, loads its parameters into the VP7configure™ Wizard. If there is an invalid line in the file, an error message will be displayed showing the invalid line. If an error message appears, click **OK** to continue reading the rest of the file, or click **Cancel** to stop.

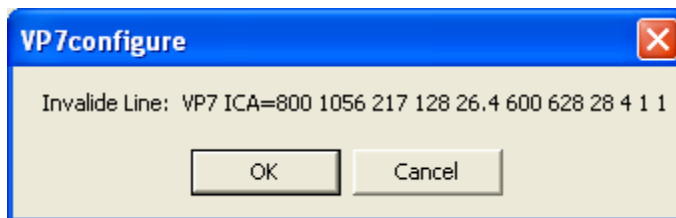


Figure 36 Invalid Line

7 Feedback Level

Two different levels of feedback can be used when communicating with a VP7. To change the feedback level select **Options->Set Feedback Level to High/Low**.

When “Low Feedback” is selected, if unexpected data is in the serial buffer while communicating with the VP7, it will be ignored, unless it is an error. When “High Feedback” is selected, any unexpected data in the serial buffer will be shown in a message box, and the current VP7 communication will be stopped.

8 Contrast Tables

The “Contrast Tables” are tables stored in the VP7™ which contain contrast values for each step of manual control. There are three such tables for different analog voltage ranges and step numbers.

If the contrast is being controlled by the analog input, one of the three tables can be used. Table 1 can be used for an input ranging from -9V to +9V, and has 32 steps. Table 2 can be used for an input ranging from 0V to +5V, and has 16 steps. Table 3 can be used for an input ranging from 0 to +9V, and has 32 steps.

To select a value for the contrast under analog control, the input voltage is measured and compared to ranges for each step in the table. For example, Table 1 is being used, which ranges from -9V to 9V. The analog input is measured to be 0V. Step 16 is chosen since 0V falls within its range. The contrast value stored in step 16 is used.

If the contrast is being controlled by the digital contrast control, one of two tables can be used. Table 1 can be used to have 32 contrast steps, and Table 2 can be used to have 16 contrast steps. The same contrast tables are used for digital control as the tables used for analog control, but the digital control disregards voltages ranges. The step number to choose from the table is set by the digital counter.

8.1 Contrast Table Editor

Use the “Contrast Table Editor” to change the contrast values stored in the contrast tables. Select **Maintenance->Contrast Table Editor** to open the editor.

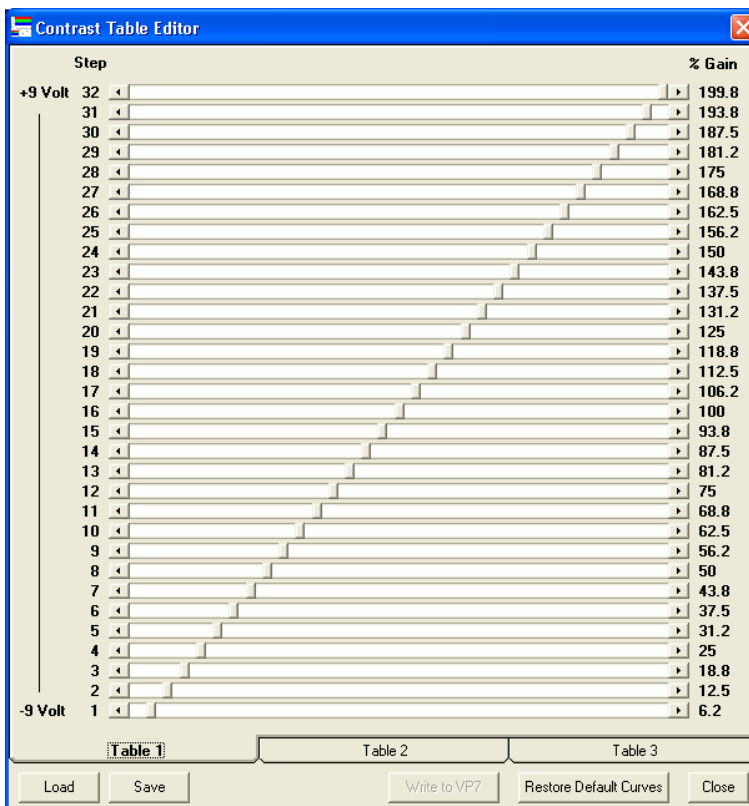


Figure 37 Contrast Table Editor

8.1.1 Editing a Table

To edit a table, first select the tab for the table you wish to edit (**Table 1**, **Table 2**, or **Table 3**). To change the contrast value for a certain step, move the slider beside the step number to the desired value. As the slider moves, the “% Gain” is shown to the left.

To return to the default table settings, click **Restore Default Curves**.

To store the tables onto the VP7™, click **Write to VP7** if a VP7™ is connected. If one is not connected, this button is disabled.

8.1.2 Saving a Table

To save the settings for the tables to the PC, click **Save**. Contrast table files are stored with the extension “*.cts.”

8.1.3 Loading a Table

To load a saved table settings file from PC, click **Load**. You will then be prompted to select a file with the extension “*.cts.” After selecting the file, its settings will be loaded into the editor.