



## *plasma Enhancer™*

### **Road to Pixel Perfect 1:1**

Plasma Enhancer PE1000 Pro and Crsytalio have a "Pixel Magic System" to set pixel perfect 1:1 for display devices. This document try to provide some information or guideline to help you setup Pixel Perfect!!!

#### **What you need to start with:**

##### **1. DVD Players**

Make sure you are using 480i output (analog or digital) from your DVD player. Most newer DVD players do not support digital out in 480i ! Do not use 480P as an output format because you don't want double scaling. If this is the case for you, use component 480i instead.

##### **2. Display Panel Information**

Knowing your display's (Plasma or LCD) native resolution and find an input port that supports native resolution input. Surprisingly, this is not a given. Some TVs (Plasma & LCD) will not allow you to bypass their internal scaler, we will take care of this case later. Also, it is almost a must to find out the signal timings for your display panel. For this, you either call your display's manufacturer, find it on the internet or trial-and-error by yourself.

#### **What you need to do:**

##### **Case 1 : Digial In / Digital Out**

The best scenario is that your DVD player has 480i digital output and your display has a HDMI or DVI input port that support the panel's native resolution and Crystallo's/PE Pro's default resolution's timings. If it works for you then you are in luck.

## Case 2 : Analog In / Digital Out

Connect your DVDP's Analog output to Crystalio/PE Pro and use Digital output to you display panel. If you have a digital input on your display that accepts Crystalio's/PE Pro default timings, it will work just fine. If not, you will have to input all the custom timings yourself using Crystalio's/PE Pro Pixel Perfect DVD.

## Case 3 & 4 : Digital or Analog In / Analog Out

Using Component input on your panel probably would not work because most component inputs only accept timings for 480i/p, 576i/p, 720P or 1080i and your display's native resolution are highly unlikely to be in one of the above categories.

Your best bet is VGA or RGBHV inputs on your Panel because at least you know it bypasses your panel's internal scaler.

### Let Start Pixel Maigc System:

(1) Preparation:

DVD Player: Denon A11 with SDI mod

Scaler: Plasma Enhancer PE1000 Pro

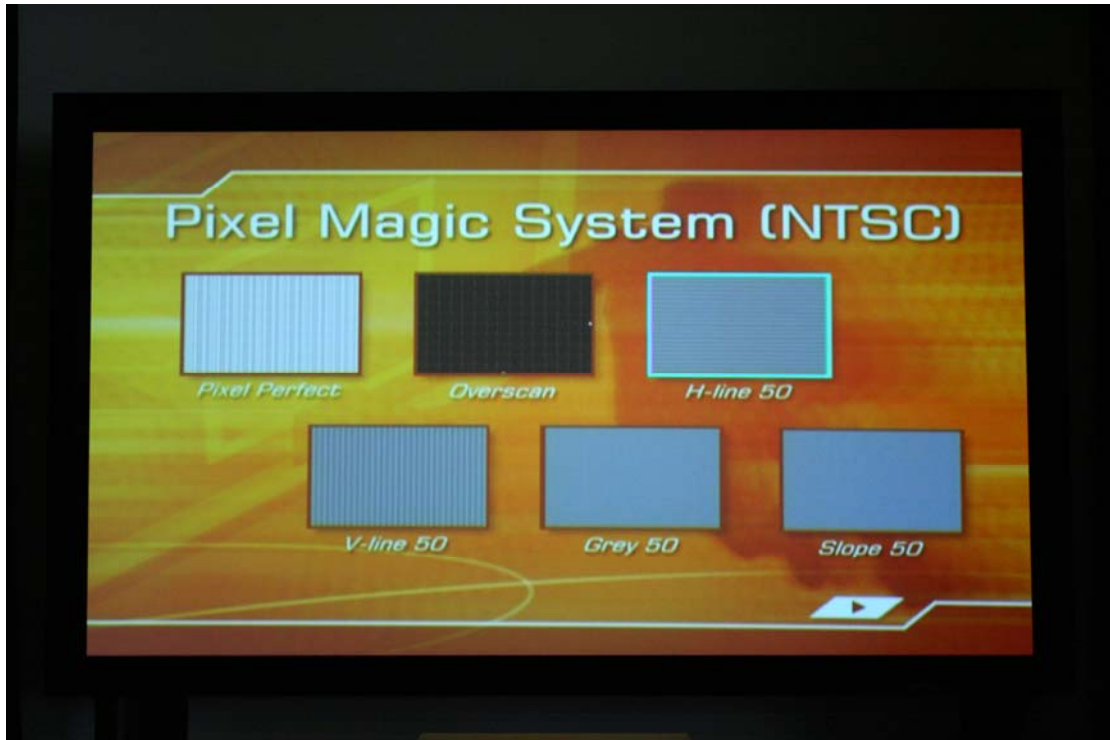
DVD Disc: Pixel Magic DVD

Projector: JVX SX21 (Resolution: 1400x1050)

Path: DVD Player -> (SDI Cable) -> Scaler -> (HDMI->DVI Cable) -> Projector

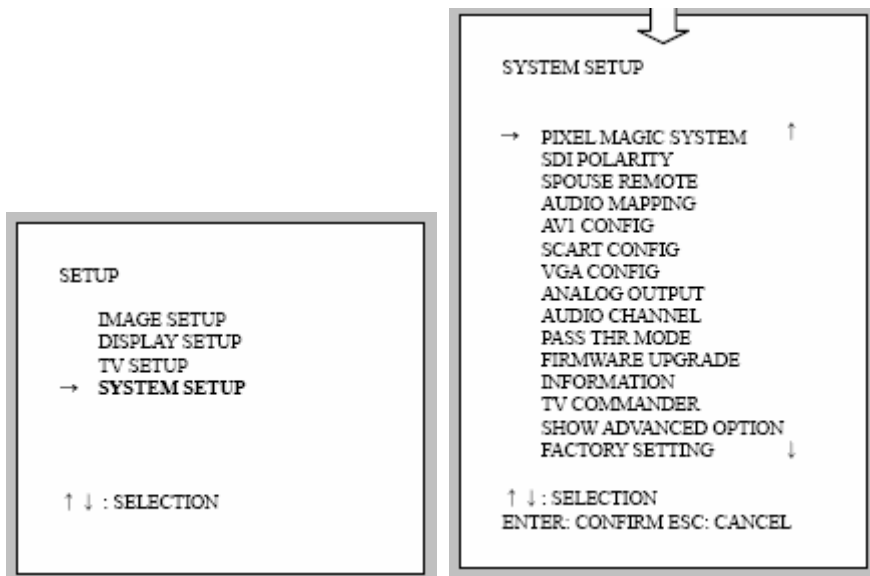


(2) Plasma Enhancer PE1000 Pro Setup

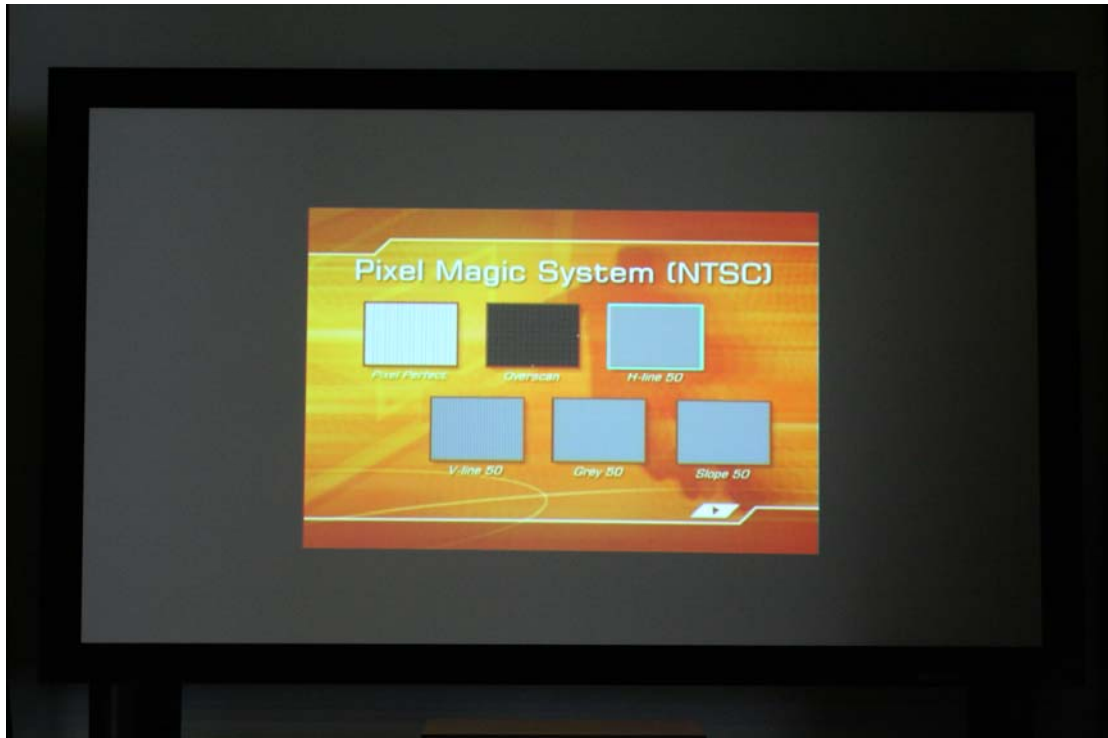


Press "Menu" button go into setup menu.

Select "PIXEL MAGIC SYSTEM"



Now, you will see the following small image on center



Now, play Chapter 1 for Pixel Magic System DVD

If your output resolution is 1:1 mapped, you will see a clear text for Chapter 1 pattern.



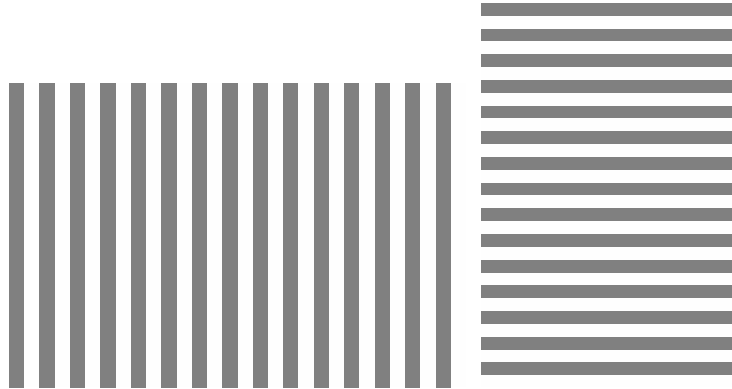
In most cases, you can get a 1:1 mapped output by selecting correct output resolution in the preset resolution list. I just select 1400x1050 in the preset resolution list in Plasma Enhancer Pro and get a 1:1 mapped output ☺

If you can't see the above Pixel Magic clear screen, your output resolution still not in pixel perfect mode. Now, please refer back your display device manual and find out whether your display device can accept its native resolution (e.g. Sanyo Z2: 1280x720, Dell 23" LCD: 1920x1080). Actually, some output devices may not accept native resolution input. So, please try different preset resolution to choose the best compromise of it.

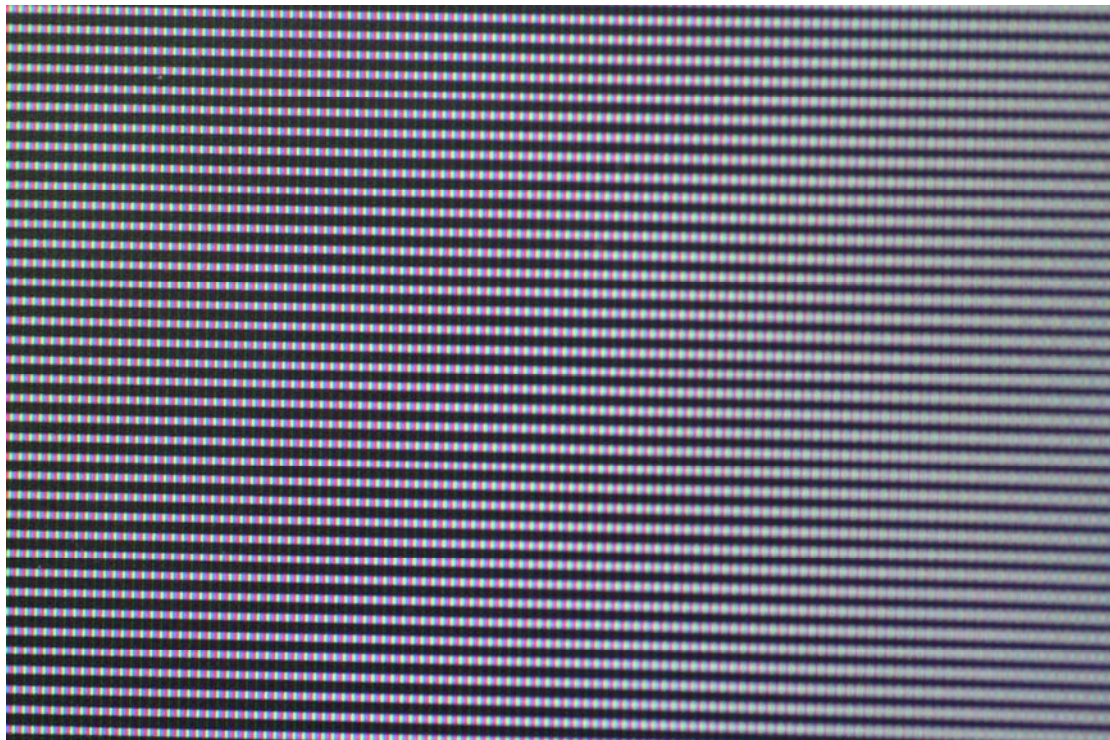
(3) Road to pixel perfect

The key concept of pixel perfect is related the Chapter 3 and Chapter 4 patterns.  
For Chapter 3 pattern, called “H-line 50”, it uses to make sure the vertical resolution is pixel perfect.  
For Chapter 4 pattern, called “V-line 50”, it uses to make sure the horizontal resolution is pixel perfect.

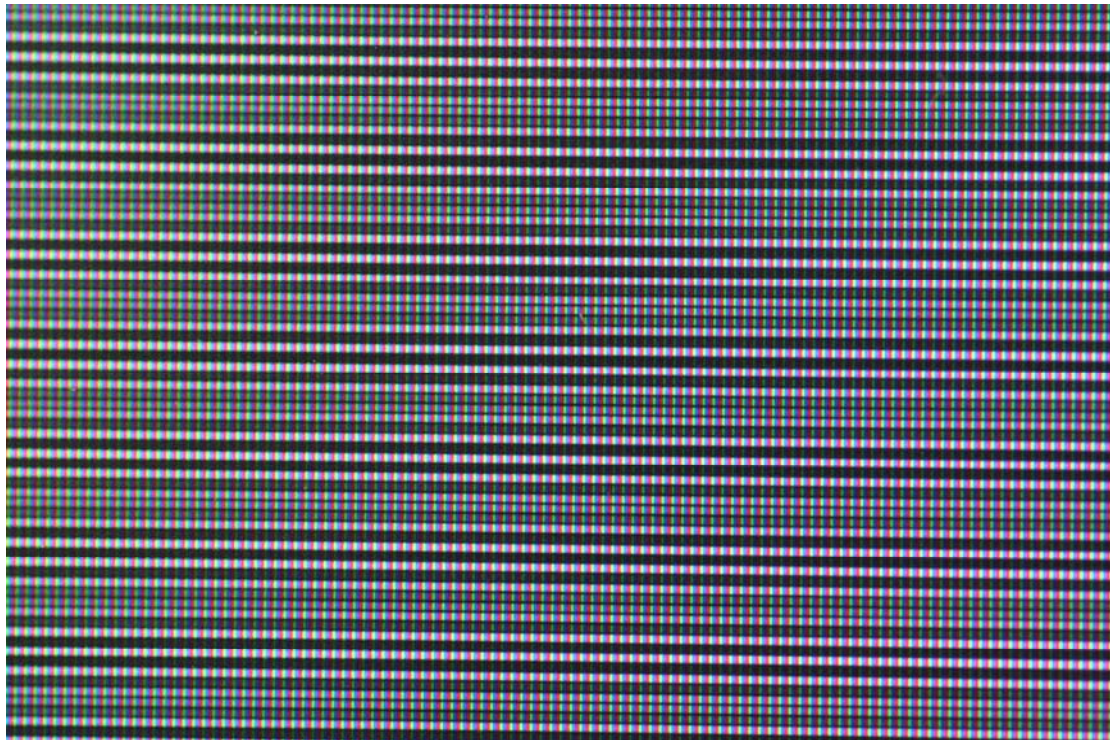
The goal is to make the “H-line 50” and “V-line 50” look likes this:



Here are more screenshots:



**PIXEL PERFECT CASE FOR HORIZONTAL**

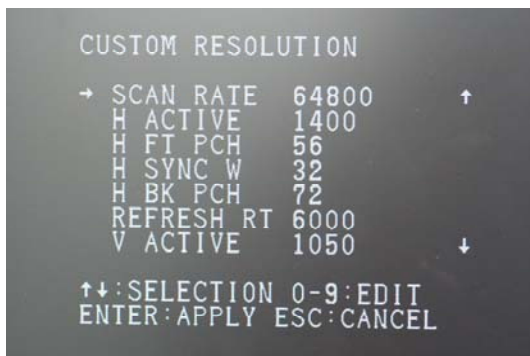


**PIXEL NOT PERFECT CASE FOR HORIZONTAL**

You should see a grey color showing on odd sequence.  
 (e.g. Grey line, No display, Grey line, No display ...etc)

If you can't see a line-by-line clear pattern, that mean you still not in pixel perfect.

Press "Enter" button to start customized output timing. You need to make a own customized resolution that is matched your display device.



SCAN RATE: Horizontal scan rate

H ACTIVE: Horizontal active pixel ( For JVC-SX21, native resolution is 1400x1050.  
 So, H ACTIVE = 1400)

H FT PCH: Horizontal front porch

H SYNC W: Horizontal sync width

H BK PCH: Horizontal back porch

Refresh RT: Vertical refresh rate (Most common refresh rate is 60.00Hz. So, REFRESH RT = 6000)

V ACTIVE: Vertical active pixel ( For JVC-SX21, native resolution is 1400x1050. So, V ACTIVE = 1050)

V FT PCH: Vertical front porch

V SYNC W: Vertical sync width

V BK PCH: Vertical back porch

PIXEL CLK: Total pixel clock output

Firstly, please make sure the Horizontal active pixel and Vertical active pixel are same as display device native resolution. Secondly, no need to adjust Horizontal scan rate and pixel clock. The values will automatically calculated by system. For the front porch, back porch and sync width, those are inactive pixels which only meaningful for devices.

Please play chapter 3 (H-line 50) first to get a vertical pixel perfect. If you can't see the line-by-line clear pattern, please change different combination for front porch, back porch and sync width. Different output devices prefer different values of these three parameters, please try it yourself.

In my own experience, please try to adjust front porch first. If you can't get a pixel perfect by adjusting front porch, please adjust the back porch / sync width at the same time.

Sometimes, you may need to do the following: front porch + 10 but back porch – 10. Try more different combinations and you may get some idea to achieve the goal easily.

After you success to make the vertical pixel perfect, using the same idea to make horizontal pixel perfect by playing chapter 4 (V-line 50).

Actually, the "Pixel Magic System" may take 1 ~ 2 hours for setup. Please be patient and try as good as you can.

Congratulation, you are success output Pixel Perfect timing for your display device.

**Case Study: User Slimer to setup Pixel Perfect of Crystallo for Pioneer 505**

By using the CORRECT signal timing and the Pixel Perfect DVD, you can start calibrating your display. By saying CORRECT, I mean the original timings that your display is using internally. For example the Pioneer 505's native resolution is 1280 X 768, there is a lot of different timing setups (PC's WXGA) that provide 1280 X 768 resolution but your panel will only take them as 1024 X 768 as for Pioneer 505. I have tried 5 different sets but none worked except the ORIGINAL Pioneer 505 timings. If you entered the correct timings, your panel will display "1280 X 768" on your display.

While calibrating with the Pixel Perfect CD, you may find interference on the calibration pattern. Look into your panel's on screen menu and see if you can find "CLOCK" and "PHASE" adjustment for the particular analog input port. Yes, the Pioneer 505 and 435 has these functions. Adjust "PHASE" to shift the interference out of the picture and "CLOCK" to further tune and match the clock frequency of you panel and Crystalio. Use "MOVE PATTERN" function on Crystalio to make sure ALL parts of the screen is noise-free.

Special thanks: Slimer wrote a good introduction for this document.