

slate

MEDIA TECHNOLOGY



RAVEN

Pixel Standards, Environmental effects and Mura standards for All Raven Models

This guide illustrates Slate's standards for aberrant pixels in all iterations of Raven models, and discusses environmental and Mura effects that may be present in certain circumstances

Overview

This manual covers three main aspects of display panels; pixels, mura (clouding) and environmental concerns such as humidity.

Pixel Standards

We use Grade A display panels in our products. Our policy: We shall not ship any screens with dark (“dead”) pixels. Display manufacturers advise that a certain percentage of screens will develop a small number of errant pixels over their service life. This is to be expected and in general goes unnoticed. Our standards for shipping are *higher* than those of many manufacturers, however we can only warranty the display to the *same* standard of the display panel manufacturer. Information on the standards follow later in the guide.

Mura (Clouding)

Mura (clouding) is an effect present to some degree on all LCD display panels. It is caused by small and natural deformations in the crystal substrate and other phenomenon described below. Standards for shipment are similar to pixel standards and details follow later in the guide.

Environmental Effects

Under certain conditions the atmosphere and environment can affect the performance and appearance of your RAVEN. Please see below for a set of guidelines, suggestions and standards.

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Pixel Standards

Our standards

Slate does not ship any display panels (screens) that have even a single dark (“dead”) pixel. A unit is considered acceptable if it has four (4) or less bright pixels outside of the “Star Zone,” a star-shaped region in the center of the display. Bright pixels are all but indiscernible to the naked eye and will not interfere with your workflow.

International ISO standards

ISO 9241 describes the ISO’s tolerance for LCD screens dependant on their class. You can view this at: https://en.wikipedia.org/wiki/ISO_9241#ISO-9241-302.2C_303.2C_305.2C_307:2008_pixel_defects

Quoting from the standard, as of June 2015:

- ★ Class 0 panels are completely defect-free, including no full pixel or sub-pixel defects.
- ★ Class 1 panels permit any or all of the following:
 - 1 full bright (“stuck on white”) pixel
 - 1 full dark (“stuck off”) pixel
 - 2 single or double bright or dark sub-pixels
 - 3 to 5 “stuck on” or “stuck off” sub-pixels (depending on the number of each)
- ★ Class 2 panels permit any or all of the following:
 - 2 full bright pixels
 - 2 full dark pixels
 - 5-10 single or double bright or dark sub-pixels (again, depending on the number of each; no more than 5 bright (“stuck on”) subpixels are permitted).
- ★ Class 3 panels permit any or all of the following:
 - 5 full bright pixels
 - 15 full dark pixels
 - 50 single or double sub-pixels stuck on or off

(allowed pixel defects per 1 (one) million pixels in the TFT/LCD matrix)

Display Manufacturer’s Standards

LCD’s that come off the production line new are not 100% pixel defect free. LCD manufacturers created their own LCD grading system in order to account for the variations in pixel quality. There are acceptable limits within the LCD market to the number of dead pixels within a specific sector of the LCD. Below are the manufacturer’s terminology:

- ★ Brand new Z grade (AUO grading system)
 - Zero pixel defects- not even 1 pixel can be dead.
- ★ Brand New A grade (all other mfrs) (P Grade for AUO)
 - (1,3,3)- 1 sub pixel can be out in 1 sector up to 3 pixels can be out (these are never noticeable to the naked eye)
- ★ Brand New A minus grade (N grade for AUO)
 - (3,3,5)- up to 3 sub pixels out in 1 sector
- ★ Brand New B grade
 - (3,5,7) Up to 7 bad sub pixels.

Mura (Clouding)

The process of creating and curing an LCD display panel may result in a small amount of the following phenomenon:

- non-uniform TFT thickness
- non-uniform density of liquid crystal material
- non-uniform gap between substrates
- non-uniform color of color filters
- non-uniform lamp or backlight array
- non-uniform optical filter
- warped light guide/diffuser

These small inconsistencies result in variations in panel [luminance](#), often referred to as mura or clouding. A certain amount of this is to be expected and does not interfere with the use of the unit. Excessive mura effect is graded in a similar manner to pixels, but no ISO or manufacturer standards are available at this time. Generally, mura effects can be mitigated by following these guidelines:

- Lower the backlight brightness
- Use a screen saver
- Reduce the ambient temperature around the unit

If you believe your panel has excessive Mura, please contact our support department at slatesupport.com

Environmental Effects

Environments of extreme humidity may cause a small amount of condensation between the layers of your RAVEN touchscreen. We advise keeping your studio between 35% and 45% humidity and between 20 °C (68 °F) and 24 °C (75 °F) for the benefit of all your equipment (and the people) in your studio. In areas of very high humidity it is advisable to source a dehumidifying unit to avoid moisture buildup. When surfaces and the environment experience rapid shifts in temperature and humidity in relation to each other, moisture vapor in the air condenses and may cause equipment of any variety to malfunction. Please contact our support department if you are experiencing these effects after proper humidity and temperature control.