**SONIX**
Advanced Acoustic Solutions

Application Note 003
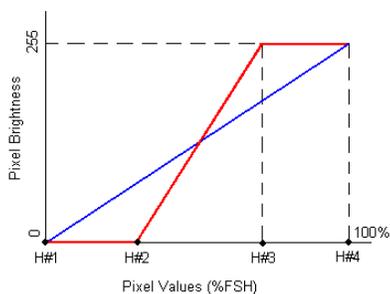## Palette Applications

Introduction

A palette is used to map pixel values (signal amplitude) to pixel brightness/color to display the image. The default palette is shown in **Figure 1(a)**, which uses a linear mapping relationship as illustrated by the blue line in **Figure 1(c)**. The vertical bar represents the range of pixel values, i.e., 0%-100% FSH. The hinge points divide the whole range into sections. The horizontal bar controls the brightness of each section of the vertical bar. For the default setting, only two hinge points are used. The bottom one represents 0% FSH and the top one represents 100% FSH. The brightness (0 to 255) is linearly mapped across this range. Properly adjusted, the palette can be used to enhance image quality and highlight the features of interest.

at 25.9%FSH and the upper one is set at 83.1%FSH. For the lower hinge point, move the scale on the horizontal bar to the most left so that it is mapped to the brightness of zero (black). Similarly, for the upper hinge point, move the scale to the most right so that it is mapped to the brightness of 255 (white). The corresponding mapping relationship is illustrated by the red line in **Figure 1(c)**. The red line has a steeper slope compared with the blue line, which is an indication of better contrast. Furthermore, image contrast improvement can be seen directly in **Figure 2**.

Default Palette   **Adjusted Palette**

Figure 2: Contrast improvement by adjusting the palette
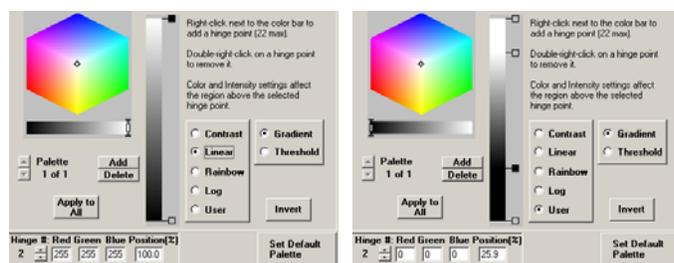
(a)   **(b)**

(c)

Figure 1: Default palette and mapping relationship

Applications

-- Contrast improvement

As shown in **Figure 1(b),** right click the vertical bar to add two more hinge points. The lower one is set

-- Color imaging

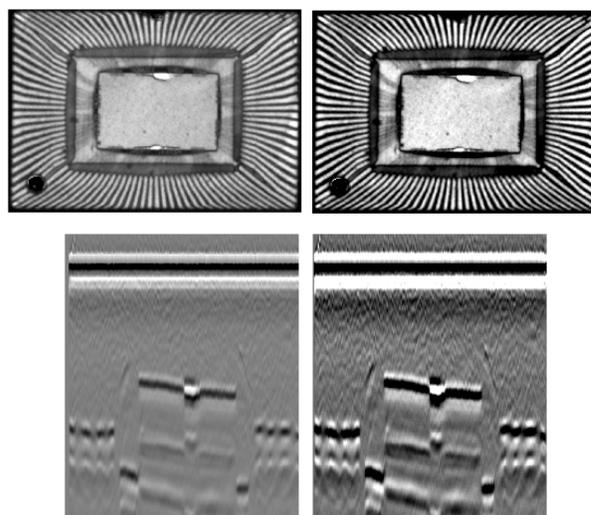Instead of using the gray scale palette, color image can be generated with a color palette. As shown in **Figure 3**, by choosing the "Rainbow" palette, the vertical bar is divided into five sections by six hinge points. The color of each section is determined by the setting of the hinge points. In this example, the stronger reflection areas are highlighted by red color, and the weaker reflection areas are highlighted by blue color.
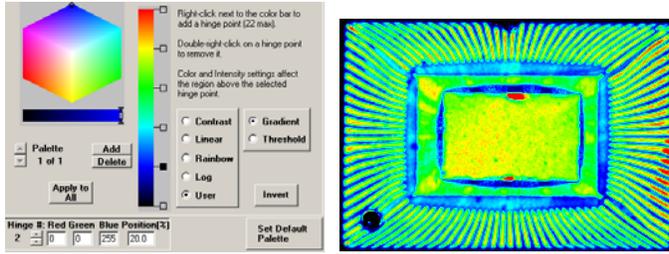
Figure 3: Color image can be generated by using a color palette

--Threshold Imaging

The default palette uses the Gradient imaging option, which means that the brightness changes continuously. The other option is Threshold imaging, which divides the image into discrete brightness bands, such as the black and white image shown in **Figure 4**. The two bands were determined by the three hinge points in the vertical bar. This imaging mode is useful when the users only want to see the suspect areas and hide the background.
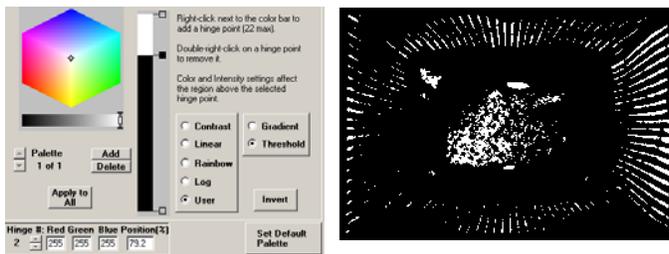

Figure 4: Threshold imaging

Notes

--The "Invert" button inverts the brightness of the image, i.e., bright becomes dark and dark becomes bright.

--The "Apply to All" button causes the selected palette to be used for all sub-images associated with the selected image (Peak, TOF, TAMI gate images, phase images, etc.).

--The "Add" button allows you to create a new palette without losing the parameters of the present palette. Click Add first, then select one of the standard palettes or design a User palette.

--The "Default" button causes the selected palette to be applied to images created in subsequent C-Scans.