

Brightness Level

The LCD's brightness can also affect the life of the product and the possibility for image retention. Reducing the brightness control to 50% (250 cd/m²) reduces the internal temperature level and allows the display to have further adjustment as the brightness level decreases over time. This is recommended in areas that have low ambient light levels or where these levels can be controlled.

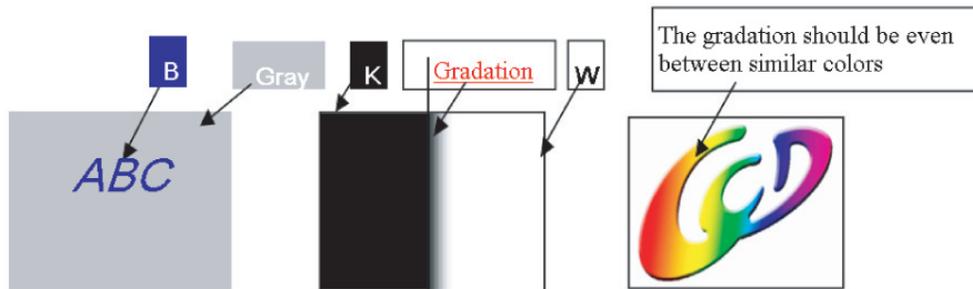
Image Patterns

High contrast patterns should not be positioned side-by-side in a fixed image. These types of patterns increase the possibility of image persistence because of the large difference in the LCD charge in these adjacent areas. An example of this would be a white box next to a black box.

Moving screens and applications can use these patterns but they should not be used in a repetitive area or motion. This can cause a blurred retention over time.

Brightly colored backgrounds are recommended to help further reduce the possibility of image persistence. Some usage examples are shown below.

Examples of a good design:



Examples of a bad design:

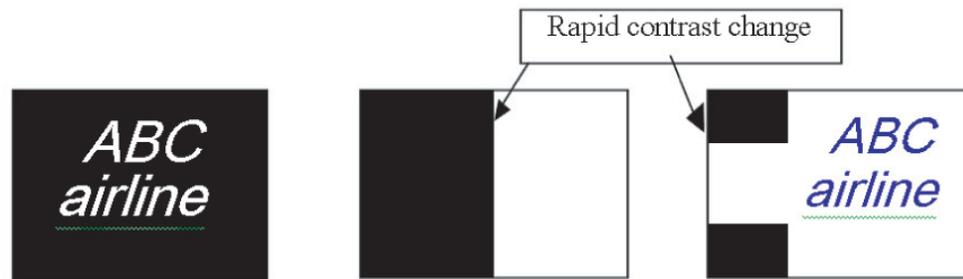
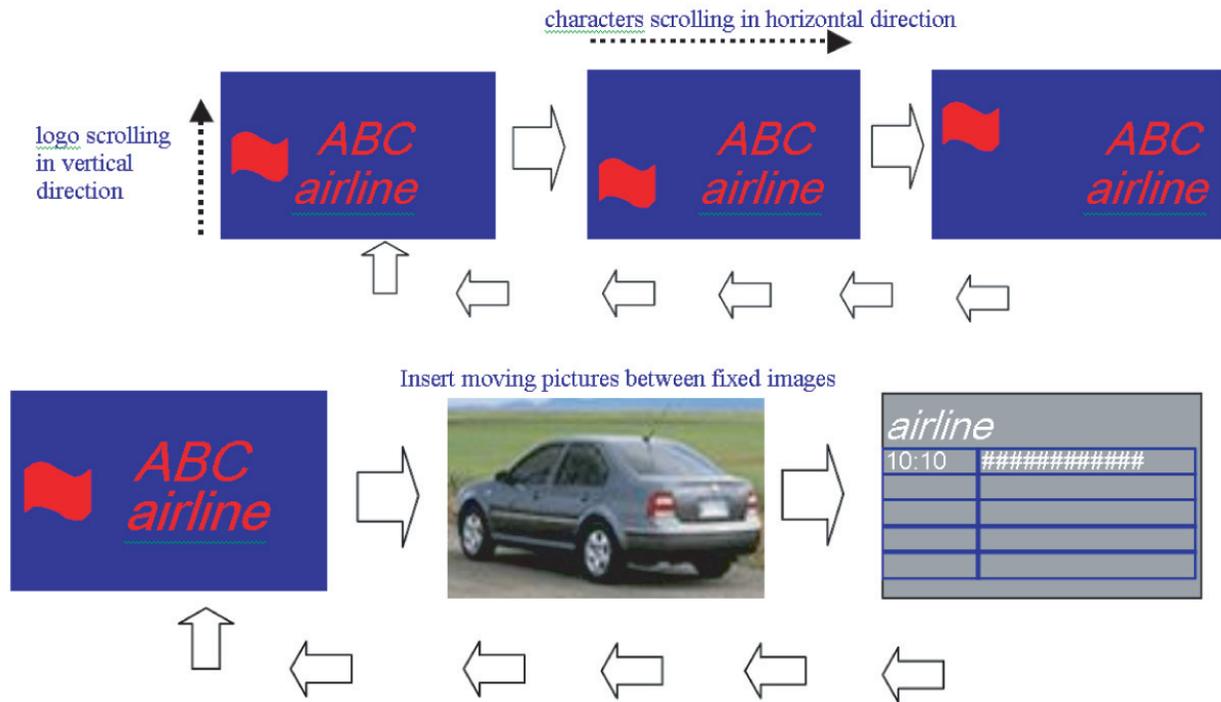


Image Motion

One of the most effective ways of reducing the possibility for image persistence is to have motion on the screen. This could be achieved by having the whole screen move or just the portions that are usually static. Some examples of this are shown below.



Temperature Control

Using the LCDs in areas with high ambient temperatures (above 35 degrees Celsius), can also decrease the time period required for image persistence to occur. The ventilation holes should also be free of dust and dirt in all locations. These may require the use of a vacuum or similar device.

NEC large-screen LCDs have internal temperature sensors that can be monitored with the remote control or RS-232C. To display the internal temperature readings, the Factory mode of the On Screen Display has to be used (please do not attempt to adjust any other controls while in Factory mode as this could affect the functionality and stability of the display). The Factory mode can be activated by pressing minus, minus, plus, plus, minus, plus, and then "SET" on the remote control within a 5-second time limit. If done successfully, the internal temperature readings will be displayed in the bottom line titled "TEMP" when the "DISPLAY" button is pressed. These temperature readings are in Celsius and it is recommended that they be kept below 45 degrees. Turn the display OFF and then ON to exit the Factory mode.

What to Do if Experiencing Image Persistence

In most cases, image persistence can only be seen with a low brightness background. Changing the background color to a high brightness can reduce the visibility of image persistence.



Using complementary colors can also reduce the possibility of image persistence and should be used whenever possible. Once image persistence occurs, there is no true method to calculate how long it will take to eliminate the effect. Ambient temperature, ventilation, temperature fluctuations, image pattern and the time displayed all affect how long it will take for this phenomenon to dissipate.

Due to the fact that large-screen LCDs are a relatively new technology, this document is considered a work in progress. Also, image retention is unique to each screen pattern being displayed. Life testing of the products and field data are studied to determine if this phenomenon exists and NEC Display Solutions continues to work with the LCD module manufacturer to make improvements. This document will be continually updated as test results are generated and improvements made.

This white paper was published in and based on information as of May 2005. Technical information is subject to change.

