

	Image-sticking	LCD monitors
	ISIC Quality-note May 2006	ISIC A/S

## Image-sticking on LCD monitors

LCD technology has always been known to suffer from certain image retention – Image Sticking, as it has been named. This is caused by ions polluting the material Liquid Crystal Displays are made of, and thus will occur on all LCD's. TFT is the name for the most common used technology in LCD's.

Image Sticking is a slow build up of energy (ions) in pixels that are statically turned on in a LCD. This energy will eventually keep the pixel slightly on, and so cause Image Sticking on the display. Image Sticking and the special forms of it “Ghost Image” and “Boundary Image Retention” is a reversible process, but will in rare cases, where an image has been on a LCD long enough to physically alter the crystals inside the LCD, be permanent.

ISIC has been one of the forerunners in attempts to reduce Image Sticking through active and passive measures. Research has shown that keeping the energy-build up from happening is not possible. Removing all DC components within the driving signal has removed “Ghost Images”, but any bright colour displayed on a dark background will still cause “Boundary Image Retention”.

Caused by ions, being moved around by voltage-levels, Image Sticking will only disappear by switching the LCD off. A simple rule says that Image Sticking takes approximately as long time to disappear as it takes to be created.

Tests at ISIC have shown that Image Sticking is accelerated by temperature (greater moving-activity in the ions). Freezing the LCD may reduce Image Sticking, as may impose an alternating electrical field across the display. Both these ways of removing Sticking Image have been deemed unusable in working installations.

**The only action against Image Sticking on LCD's is to follow the guidelines below.**

- 1) Avoid displaying static images for longer periods (weeks). Use screen savers or auto LCD switch off procedures in times where the system is not active.
- 2) Run LCD's at maximum 80% brightness and contrast – the reduction will only be seen as an 8% reduction in light-level to the human eye.
- 3) Create “panning” images to prevent static lines and text building up Boundary Image Retention.
- 4) Use soft colours – light grey – dark grey – light yellow - a.s.o.
- 5) Check displays for Boundary Image Retention using a 50% grey, and imply on of guidelines 1 to 4 when Boundary Image Retention is starting to form.

Source: Goran Stojmenovik, PhD – White Paper “Image sticking and burn-in in FPDs”

Image-sticking on LCD monitors			Quality-note		Rev. A
Prep: IBJ	Check: IBJ	App: TOH	First rev. 2004-03-18	Date: 2008-09-02	Page: 1 of 1