ADKOM™ **Elektronik GmbH**
The Art in Design and Technology

General information to prevent the "image sticking" at TFTs, PMOLEDs and graphic LCDs

For quite some time, the phenomenon of the so called "image sticking" at TFTs (Thin Film Transistor Displays), Passive Matrix Organic Light Emitting Diodes (PMOLEDs) and graphic Liquid Crystal Displays (LCDs) is known. The also to as "image retention" or "residual image" problem is scientifically well studied, but despite of intensive researches, a profound solution has not yet been discovered.

The opposite diagram shows the basic structure of a LC cell. Not activated, the liquid crystals rotate the polarization of the light that way, that it can pass the upper polarizer. If a voltage is applied, the crystals are newly-arranged and the light cannot pass the polarizer any more.
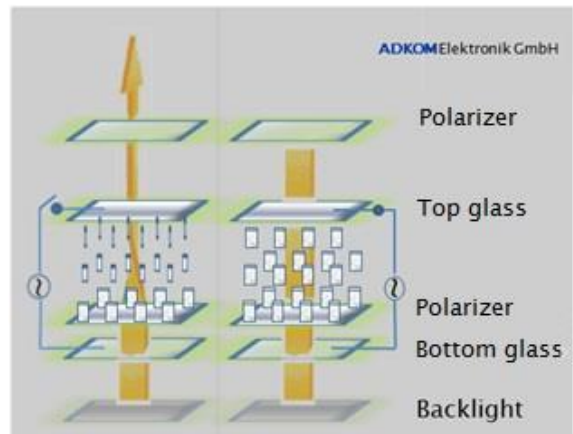
In this phenomenon of the image sticking, the liquid crystals are probably affected. A for a long time and without pixel changes displayed images, create the effect, that individual pixels are no longer closing properly, respectively they do not prevent the light penetration completely. Upon closer examination, shadows or conditions of the indicated information stand out which the display showed prior to the occurrence of the phenomenon. The shadows correspond partly to the inverted image of the original. It is unclear why the image information is retained at all. Within the individual pixel, residual voltages can be built-up, which harm the switching function. Once this effect of the image sticking has occurred, it is normally not reversible.

For detailed information on the subject, we recommend the report of Prof. Blankenbach, University Pforzheim and Gert H. von Steinaecker, Hermann Leipold, Able Design Munich, at: http://www.dv-rec.de/Temp/ed_2005_image_sticking_LCD_final.pdf

What evidence for avoidance of the "image sticking" can generally now be given?
Taking the still unexplained causes into account, two provisions may be helpful:
– The avoidance of static and for a long time unchanged shown information and pictures. When programming your application the usage of a screen saver should be provided. That is to say, that during dormant phases and up to the renewal of the display in regular intervals the image information of the display changes, or renews itself.
– Switching off the display during periods of inactivity (sleeping mode) and arousing at necessary image changes which would also be reflected as a positive side effect regarding lower power consumption. A simple "refreshing" of the screen and return to the original display content, cannot be regarded as a measure against a possible image sticking. Only through regular changes of the display content and prevention of static images this phenomenon can be prevented.

Unfortunately a guarantee by thus, that an image sticking can be altogether avoided, cannot be given.