OLED Display Module Screen Saver

Application Note

> **For any discrepancies between this document and the product specifications, the specifications take precedence.**

Screen-Saver Creation

OLED displays are similar to Plasma or CRT's in that they have a tendency to burn-in an image that is stationary on the display screen.
A screen saver application is highly recommended in order to reduce burn-in effects that may be seen on OLED displays.

A test pattern and a set of bit mapped screen-saver images have been created in order to demonstrate screen-saver functions.
The test image may be seen on the right.
Two sets of targets and two OSRAM logos have been created and displayed.
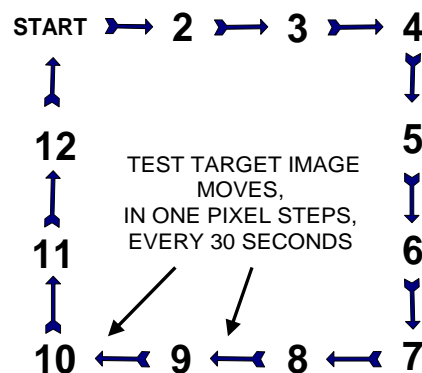The bright targets and OSRAM logo have their contrasts set around 105 nits
The dimmer targets and OSRAM logo brightness was set around 20 nits.
Please note that OLEDs show non-linear dimming as they age. This may occur under certain bias And specific image formats.

Images move at one pixel intervals along a path set up like a racetrack.
A drawing of this path is seen in the next paragraph.
The screen-saver macro is programmed to move four steps along one racetrack tangent.
It takes 6 minutes for the logos and targets to make one loop around the test racetrack. T
Image dwell time may be set for a few seconds to over an hour in length.

Screen-Saver Images Race Track

START ⟶ **2** ⟶ **3** ⟶ **4**

12 TEST TARGET IMAGE MOVES, IN ONE PIXEL STEPS, EVERY 30 SECONDS **5**

11 **6**

10 ← **9** ← **8** ← **7**

Screen-Saver Data

A three month test using test targets and logos running on a 4x4 step racetrack was performed. A photo showing how the display looked on the first day and the 90th day are shown below and on the next page.

IMAGE, 1st DAY

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IMAGE, 100th DAY

Chromameter measurements were taken everyday. Sample data is shown for the 1st , 28th, 46th, 60th, 76th, and 90th day of testing. The sample data is shown in the next column.

Screen-Saver Brightness Data

Each luminance measurement was taken at the center of each 8 x 8 target on the test screen. The display is a standard yellow 128 x 64 OLED display.

105 NIT targets

Test Dates	8 X 8 target luminance cd/m^2	
DAY 1	103	
DAY 28	94	
DAY 46	94	Start Date:
DAY 60	92	**March 30th,**
DAY 76	92	2005
DAY 100	91	

19 NIT targets

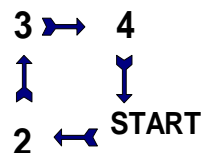| Test Dates	8 X 8 target luminance cd/m^2	
DAY 1	19	
DAY 28	19	
DAY 46	19	Start Date:
DAY 60	18	**March 30th,**
DAY 76	18	2005
DAY 100	18	

Screen-Saver Options

Alternative screen-saver paths using smaller targets and shorter racetrack pathways are also shown in the next paragraph.

2nd Alternative Screen-Saver Race Track
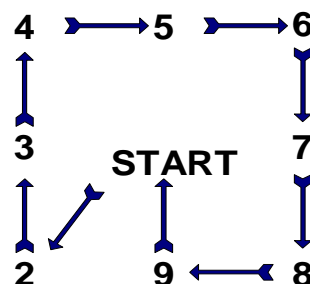
3rd Alternative Screen-Saver Race Track

Visual inspection of the display shows no apparent burn-in effects. This is true even after 90 days of continuous operation.

The display mode used for the screen-saver is called **Negative Mode.** In this mode most pixels are left off. This mode offers reduced power consumption.

More detailed information about this mode of operation is described in OSRAM's application note: # AN002.

Document written by Rich Hawkins.

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