

# IGNIS Innovation

Low Cost TV?

June 2016



# Why do we need OLED TV?

After I saw an OLED TV, I said to myself that it is time to change my plasma TV since finally a TV with better image quality was available! (a customer)

1 Superior image quality: no matter how you want to look at it!

2 Enabling different possibilities

3 Lower power consumption

4 Black level matters more even in ambient conditions!



OLED TV looks good from any angle!

# Why we do not get an OLED TV?

Too Expensive!

1 CAPEX: White OLED line requires significant capital investment

2 Material is expensive

3 Yield is an issue

4 Electronics

# How to reduce the cost?

A generic solution that address all categories is needed.

# Display Cost

$$(C_b + C_l) / (Y_b * Y_l) + C_e$$



Depreciation cost  
Material cost  
Operation cost  
IP cost

Component cost  
Manufacturing cost  
IP cost



# Yield and Repair

$$C_b/(Y_b+R_b)+C_l/Y_l+C_e$$

**35 % ↓**

Improving yield is crucial for cost reduction

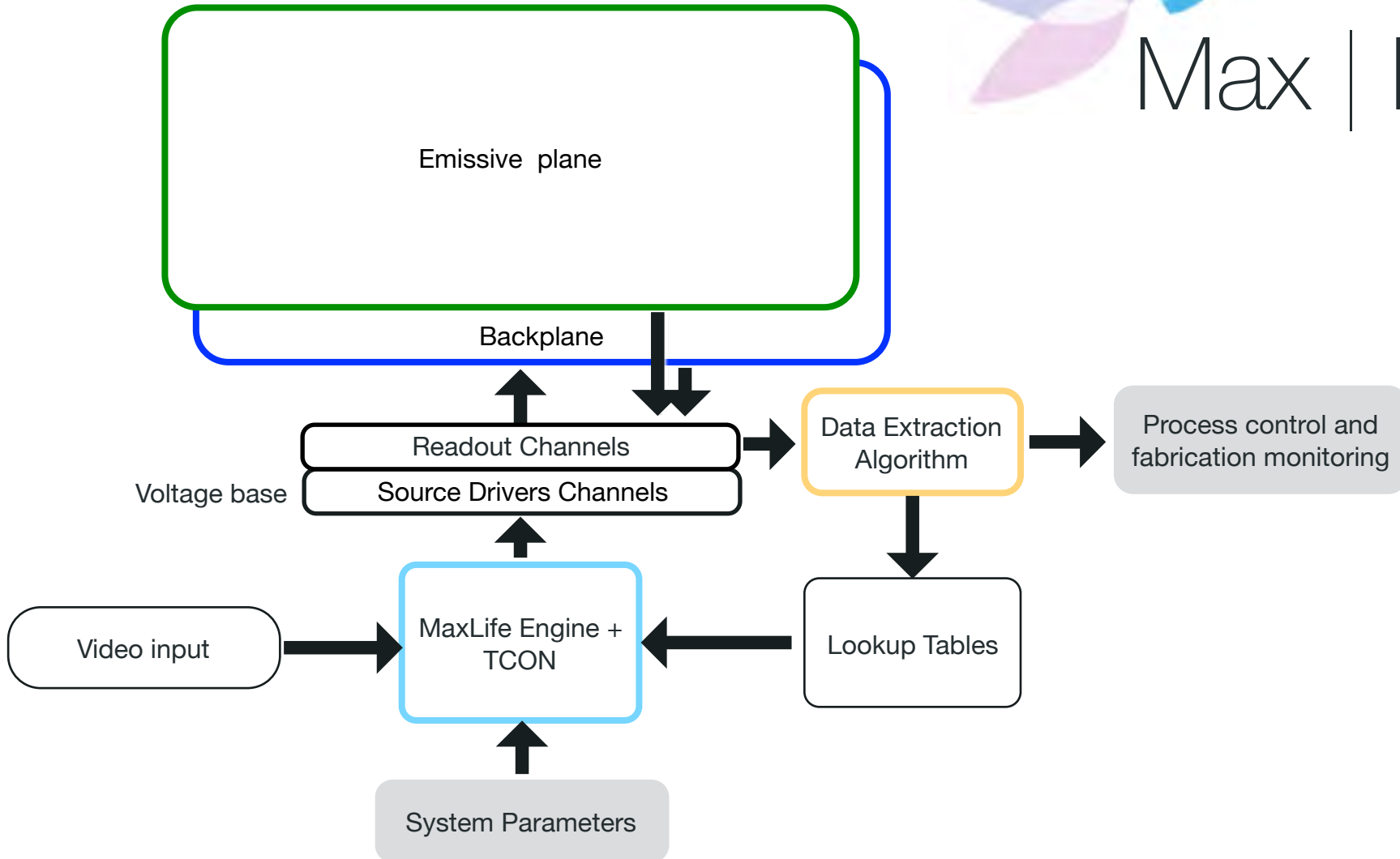
Using proper inspection can improve the cost by repair and by eliminating the yield effecting forward stage

# IGNIS MaxLife

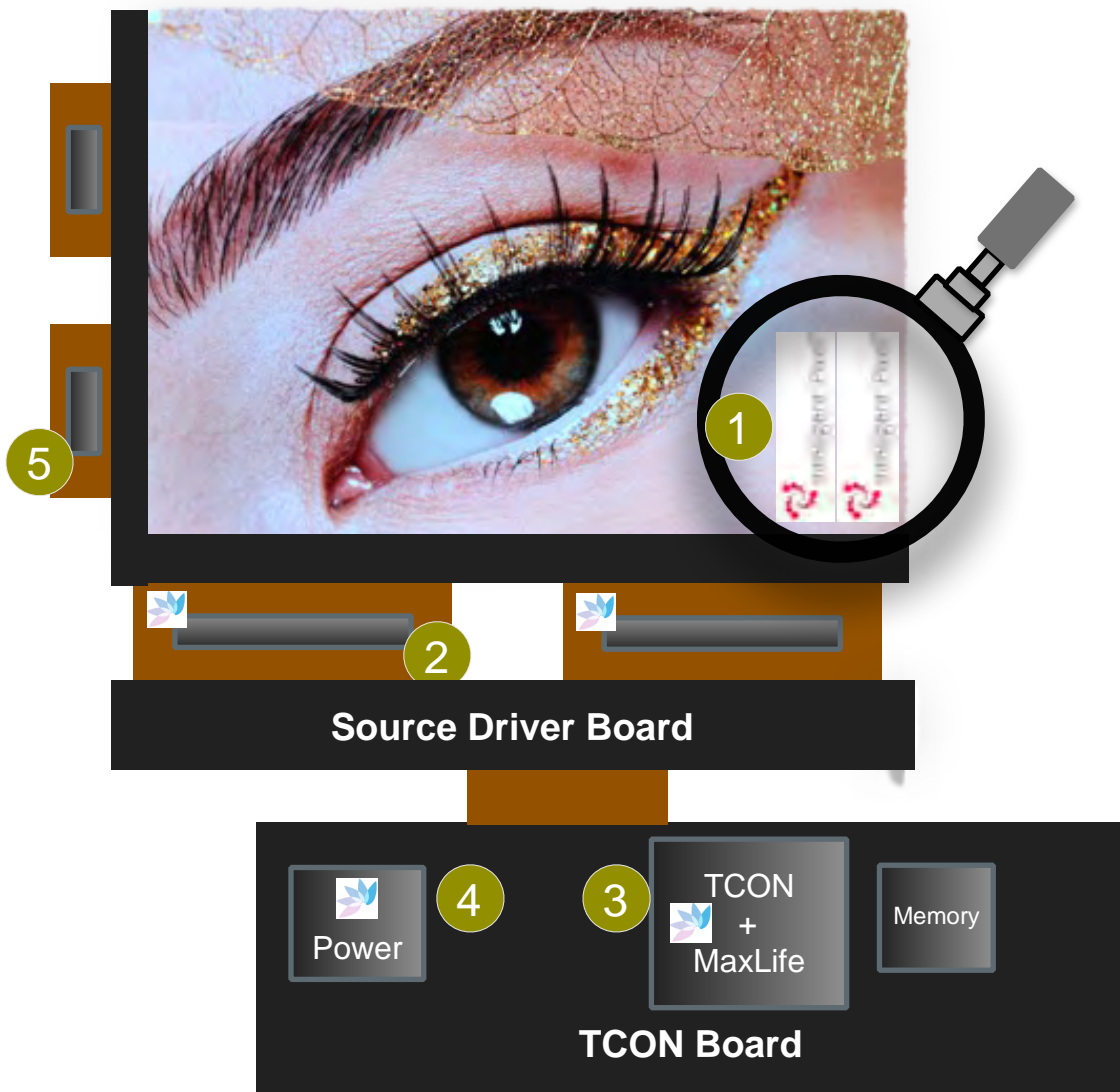
A low cost electronic system and algorithm taking the burden off the backplane and OLED!



Max | Life™



# IGNIS Platform for Large Displays

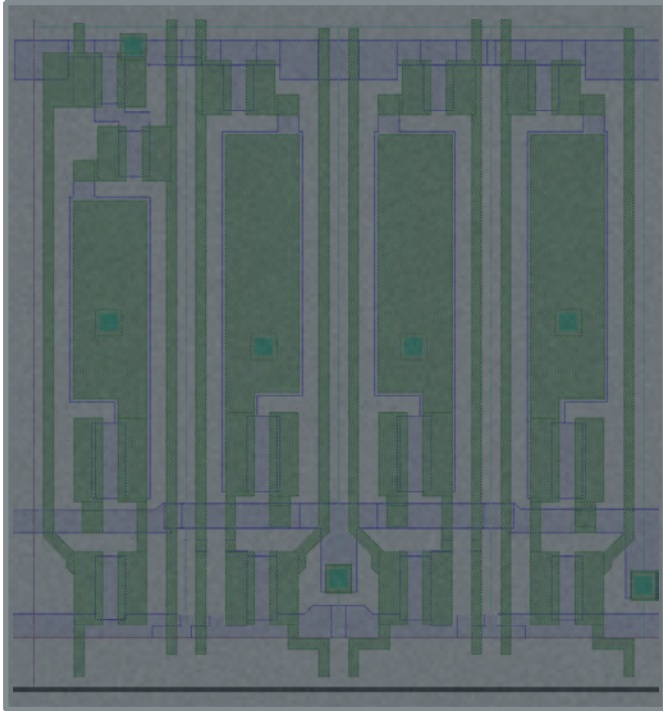


- 1 A pixel circuit allows the OLEDs and TFTs to be measured
- 2 A measurement circuit built into the source driver measures the TFTs and OLEDs
- 3 A timing controller stores the measurement data for every TFT and OLED in a lookup table (in DRAM, backed up using a FLASH memory). The controller then uses that data to boost the video data going to aged or non-uniform pixels
- 4 Power board provides different voltage levels to the display and manage the power consumption.
- 5 Gate driver for controlling different operation mode.

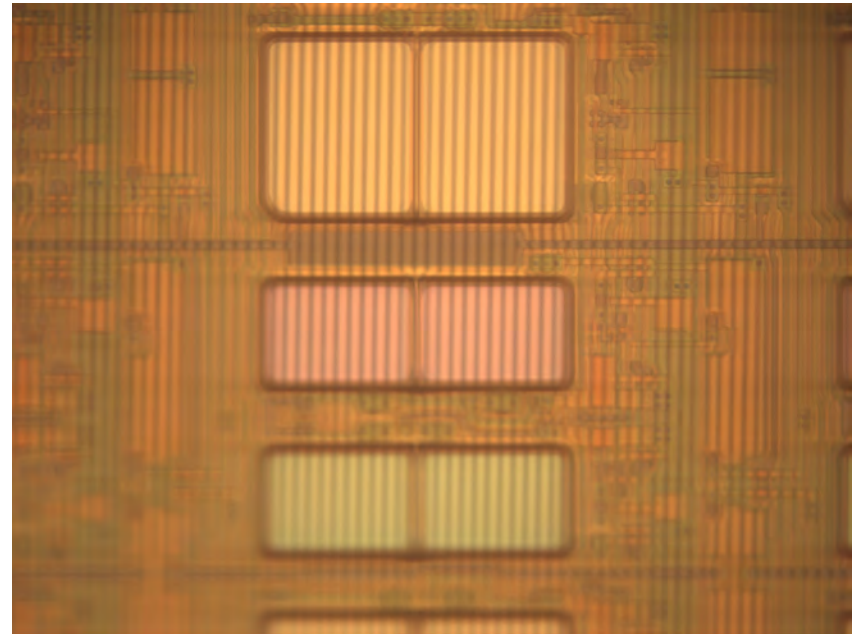
# Yield and Repair

IGNIS MaxLife System Increases the yield and enables repair

# Solution for Yield and Resolution



IGNIS Simple Pixel



Complex Pixel

# Soft Defect Compensation (Emissive Device or Backplane)

No Comp.

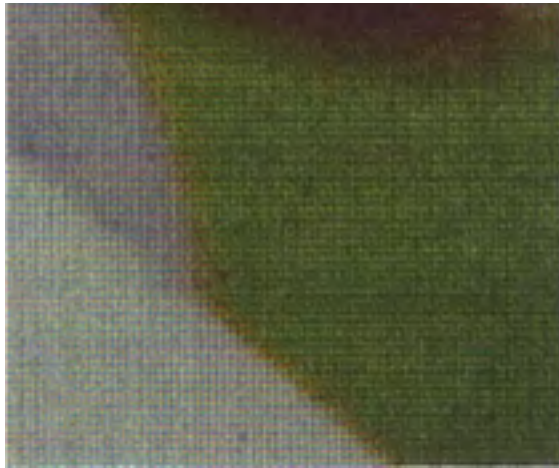


Uniformity Comp.



Soft Defect Comp.

# Hard Defect Compensation (Emissive Device or Backplane)



IGNIS Full Solution

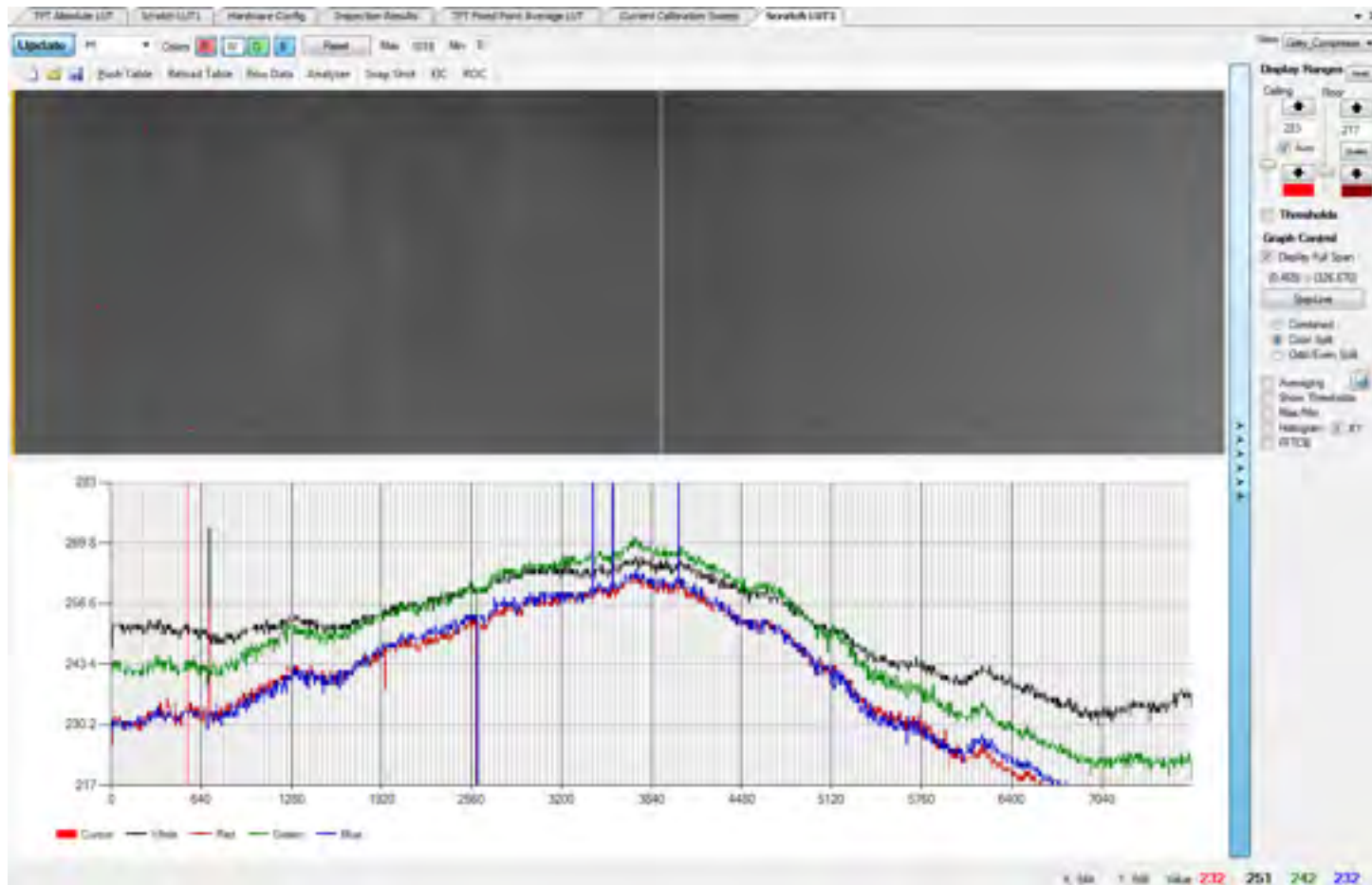


Other Solutions



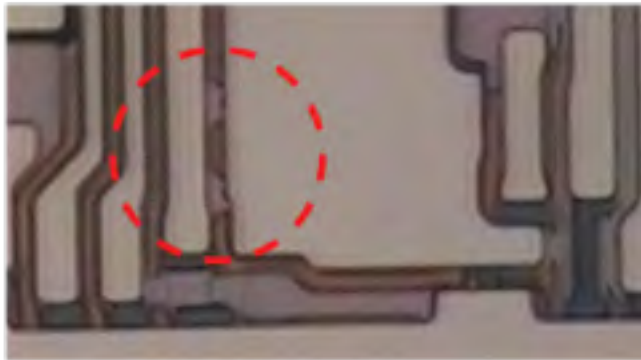
# Inspection Tool

## Analyzing data and extracting process information

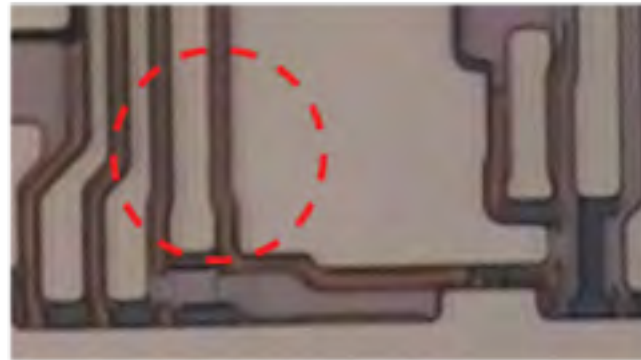


# Inspection Tool

Identifying the source of defects for repair



Finding Defects



Enabling Repair

# **Lower Cost Materials, Simple Devices, and Low Cost Fabrication Process**

IGNIS MaxLife enables lower cost devices (both for TFT and OLED)

# Low Cost Materials and Simple Devices

Lifetime is affected by low cost materials

Simple devices reduce the lifetime but result in lower costs

# Low Cost Fabrication Process

Low cost process affects the lifetime!

Printing is one of the low cost process

# IGNIS MaxLife Solves Lifetime Issue

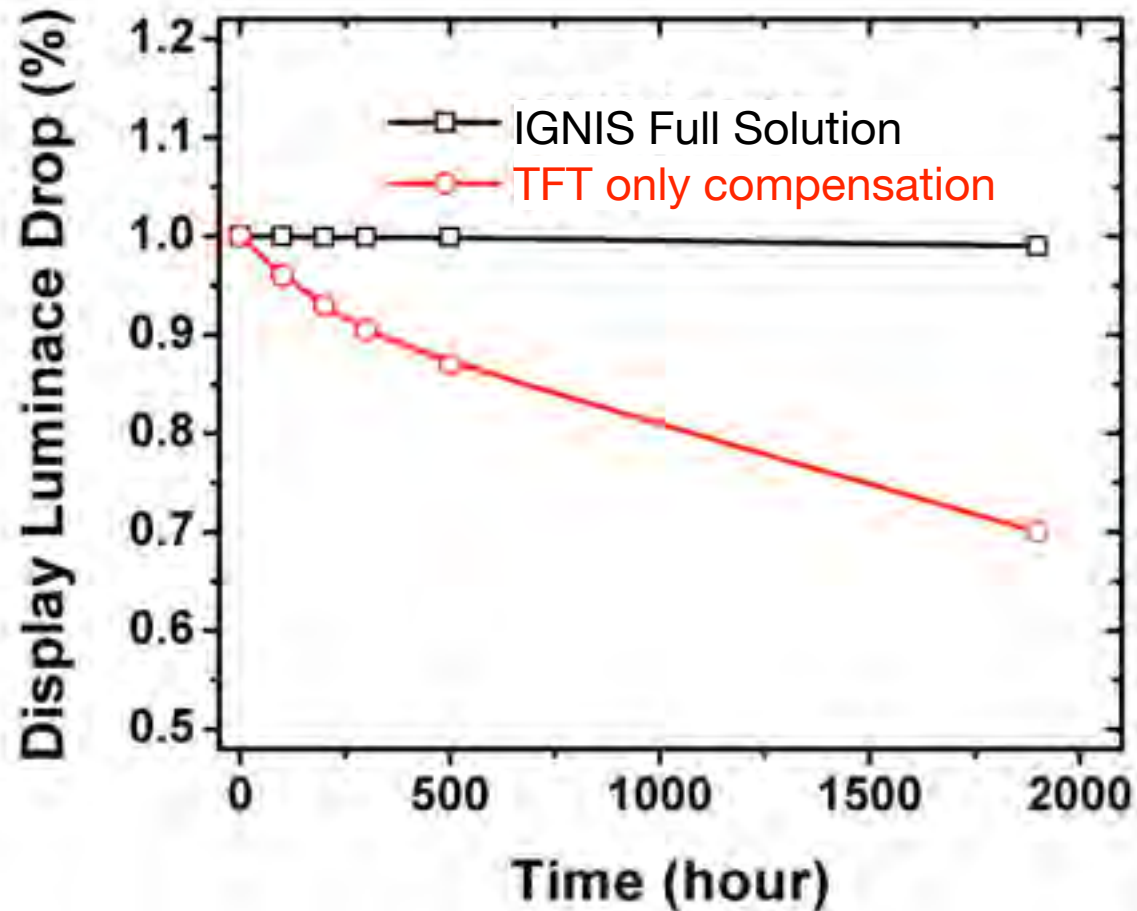
Enabling using low cost materials, devices, and fabrication processes

At no extra cost to the system

At no visible artifact on image quality

# Solution for Longer Lifetime

OLED lifetime issue



# OLED Burn-in Compensation ON/OFF!



IGNIS OLED burn-in solution is off (TFT is compensated)



IGNIS full solution (TFT and OLED burn-in are compensated)

Panel was aged with red, blue and green squares for different time (from right to left, the stress time is 1 day to 28 days)

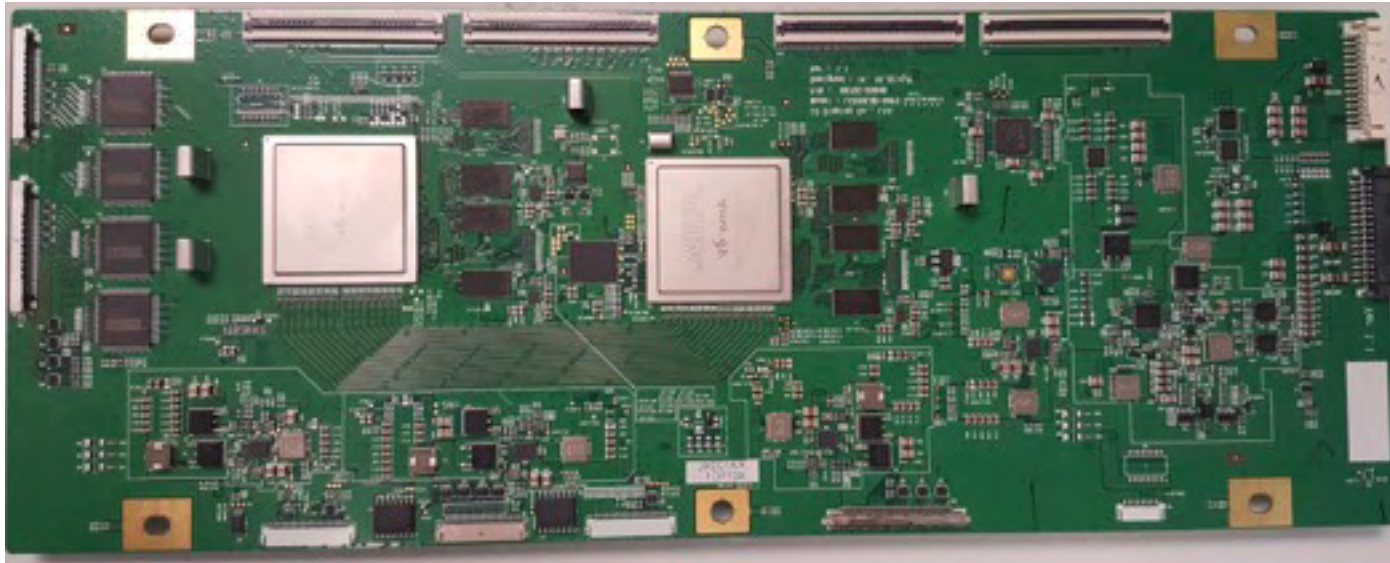




IGNIS Demo of Printed Display 2008!  
Still working fully with no sign of degradation.

# Lower Cost Electronics

IGNIS MaxLife System achieves all these with simple electronic system



## 2-FPGA TCON for TV using external compensation



**2-FPGA 2-ASIC TCON for TV using in-pixel compensation  
There were two FPGA on the source driver board as well!**



# Low Cost Electronics



**1-FPGA TCON using IGNIS MaxLife**  
**It can be very easily used as SOC or integrated in driver for mobile phone as well**

**Due to its simplicity,  
IGNIS MaxLife is being used for the design of :  
IT, Cellphone, Car, TV, VR, ...**

# IGNIS Business Plan

Strategic Partnership with a few selected partners for 2017-2018

# IGNIS Value Proposition

**IGNIS has accumulated know-how & Intellectual Properties over past 10 years that enables its partners to develop high performance AMOLED displays resulting in:**

Faster time to market

Wide range of products (TV, IT, car, virtual reality, tablet, phone)

Lower cost

Higher performance

Longer lifetime



# IGNIS Strategic Partnership

1

There is a significant gap between the existing capabilities in display companies and the final product development. Some of these issues are: TFT backplane requires AMOLED tuning, lots of defects, several reliability issues, and more.

2

IGNIS experience shows a higher chance of project success when IGNIS is more involved at different levels with its partners through out the product development process.

3

However, IGNIS has limited resources and so needs to focus its effort on only a few of committed partners and develop commercial products in collaborations with them.