

# A Clear View on Display Technologies for Your GUI Needs

Bruno Recaldini – Densitron Displays





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# Densitron Technologies

- Established in 1970
- Solution provider of displays and associated hardware and services
- Focus on the Industrial marketplace
- Global company with Local Support
- Established and Profitable business



# Display Technologies Landscape: Emissive vs Non-Emissive

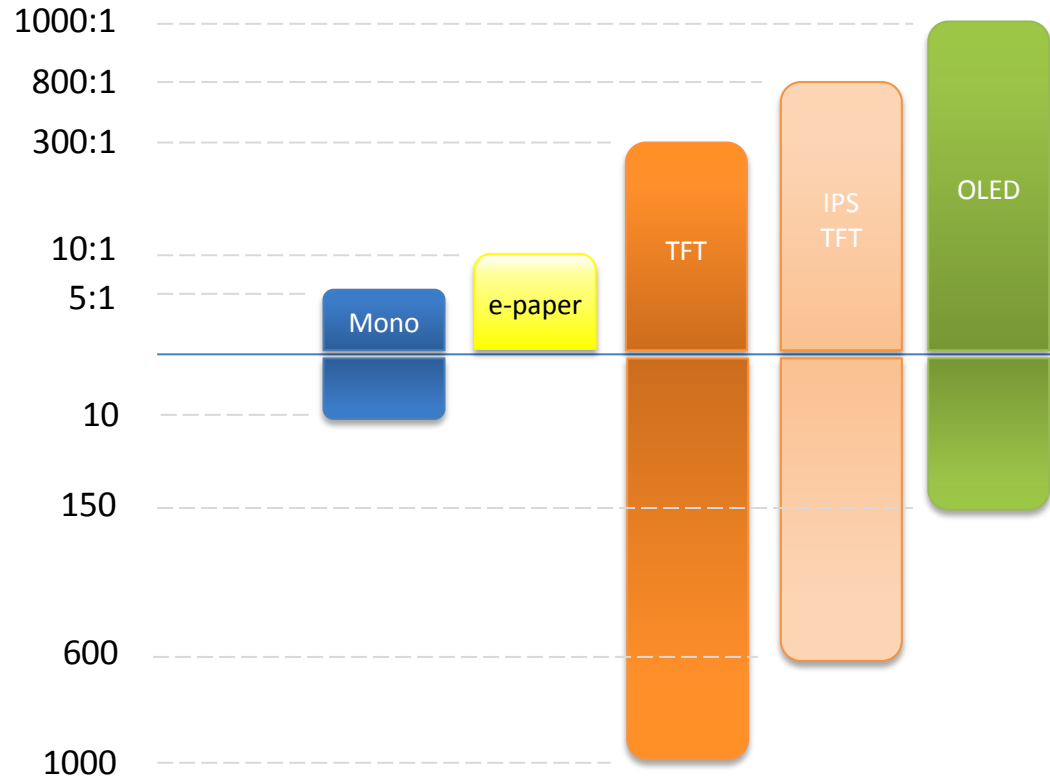
## Emissive



## Non-Emissive



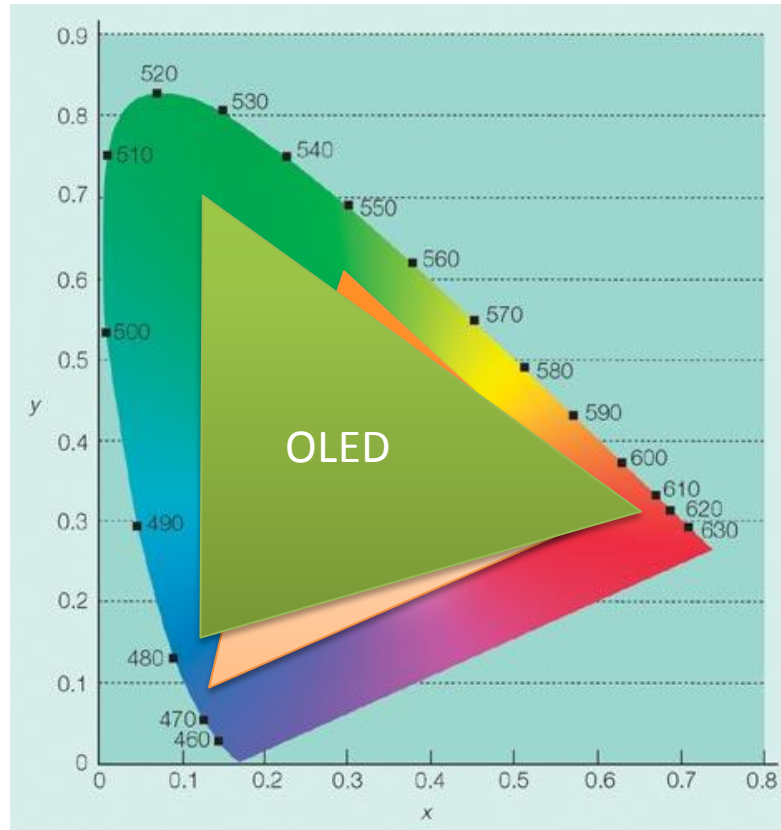
# Contrast Ratio vs Brightness



Contrast Ratio

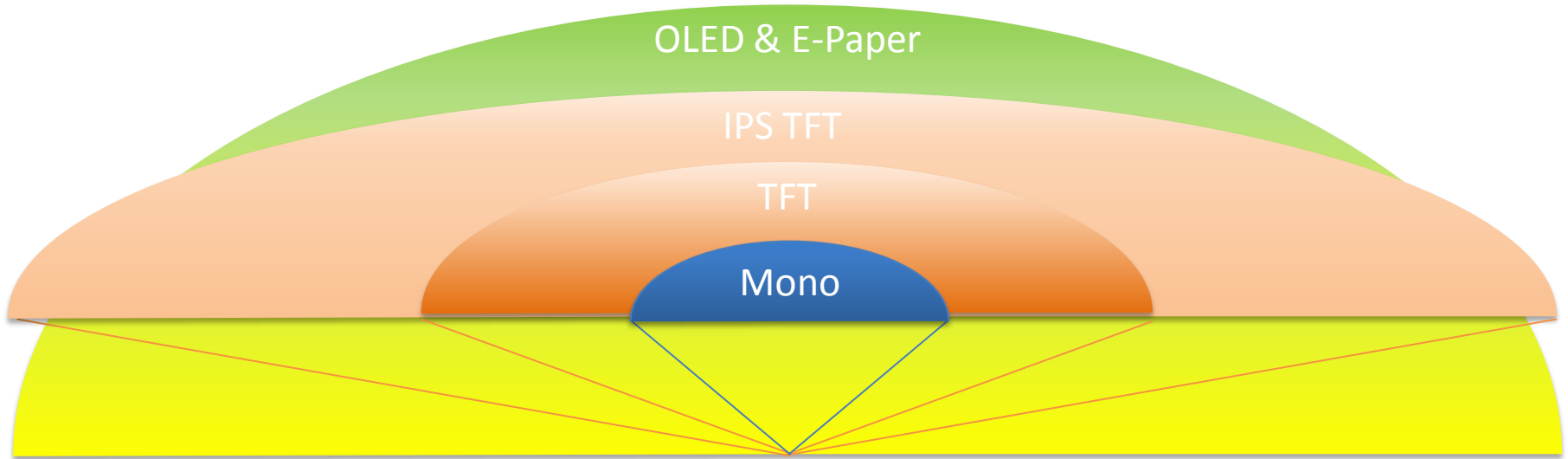
Brightness (nit)

# Colour Saturation

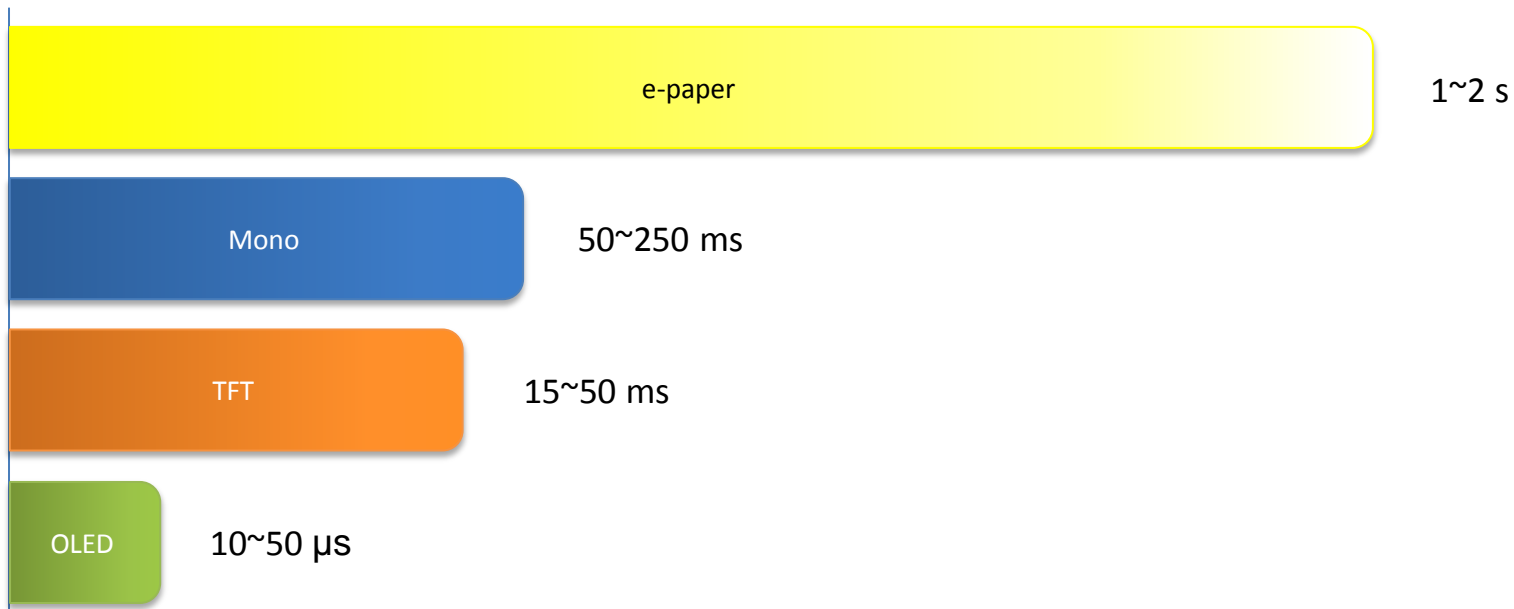




# Viewing Angle



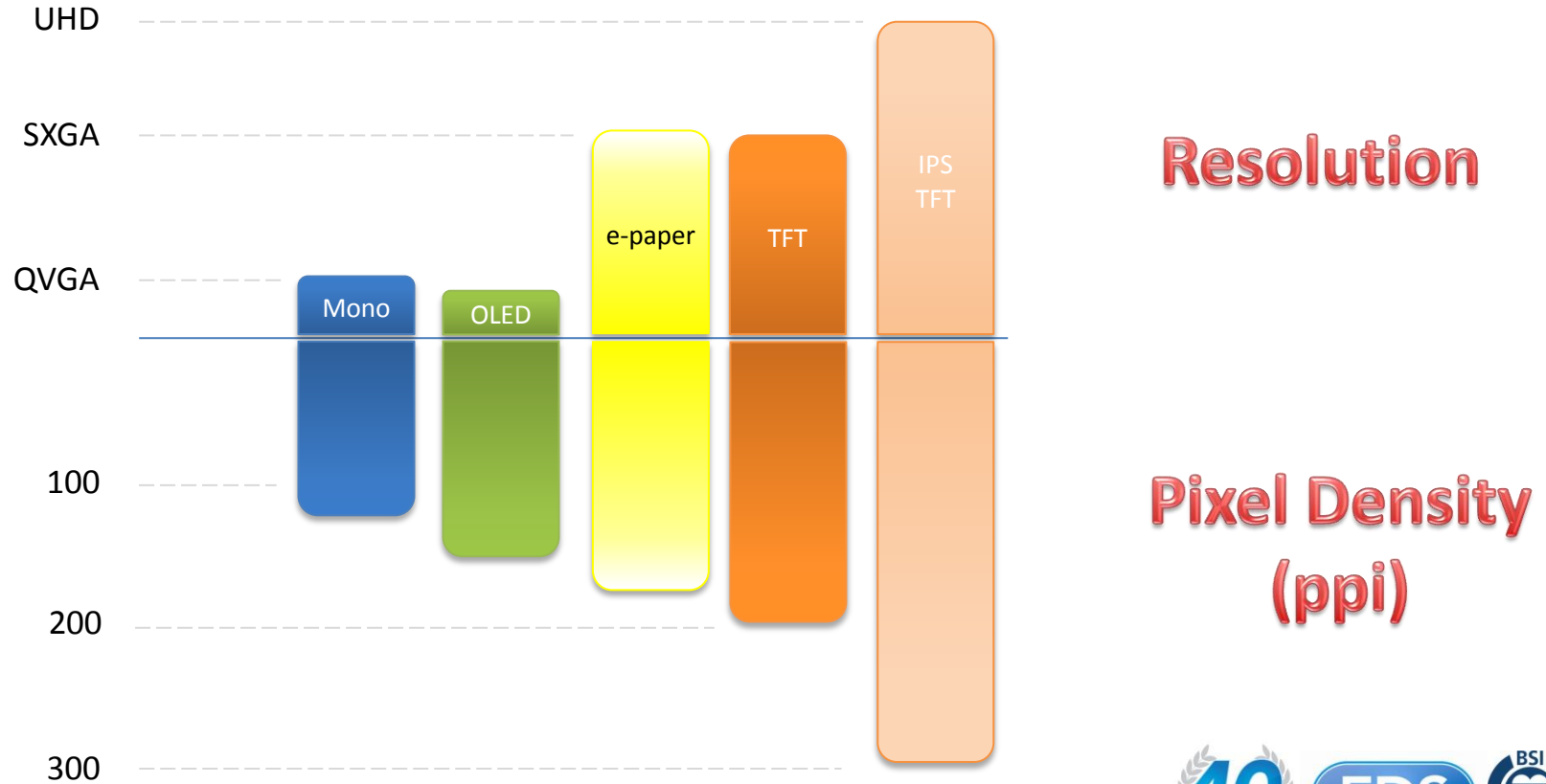
# Response Time





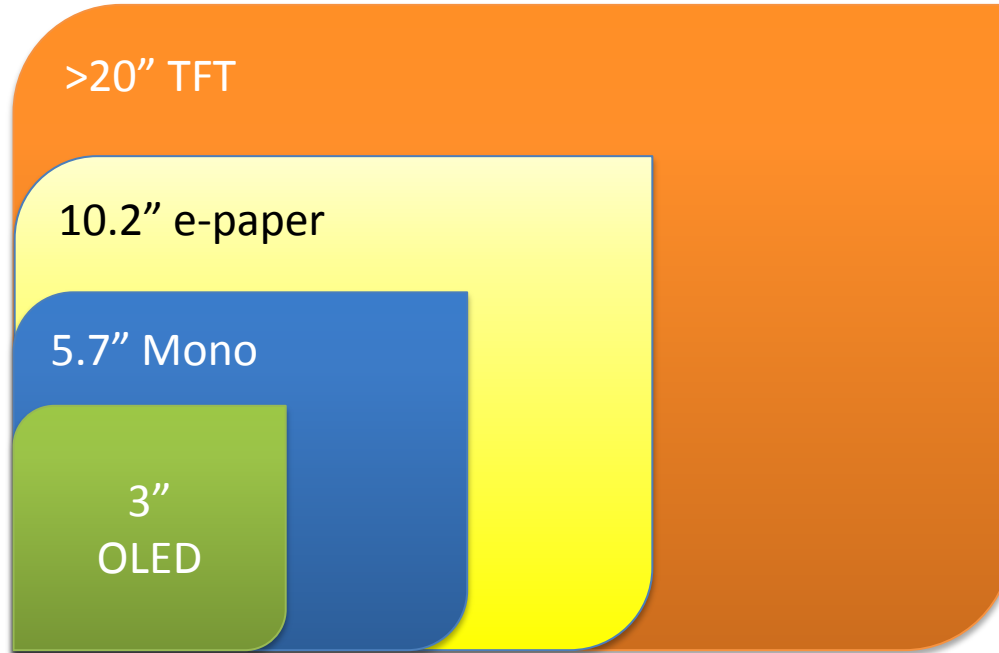


# Resolution vs Pixel Density

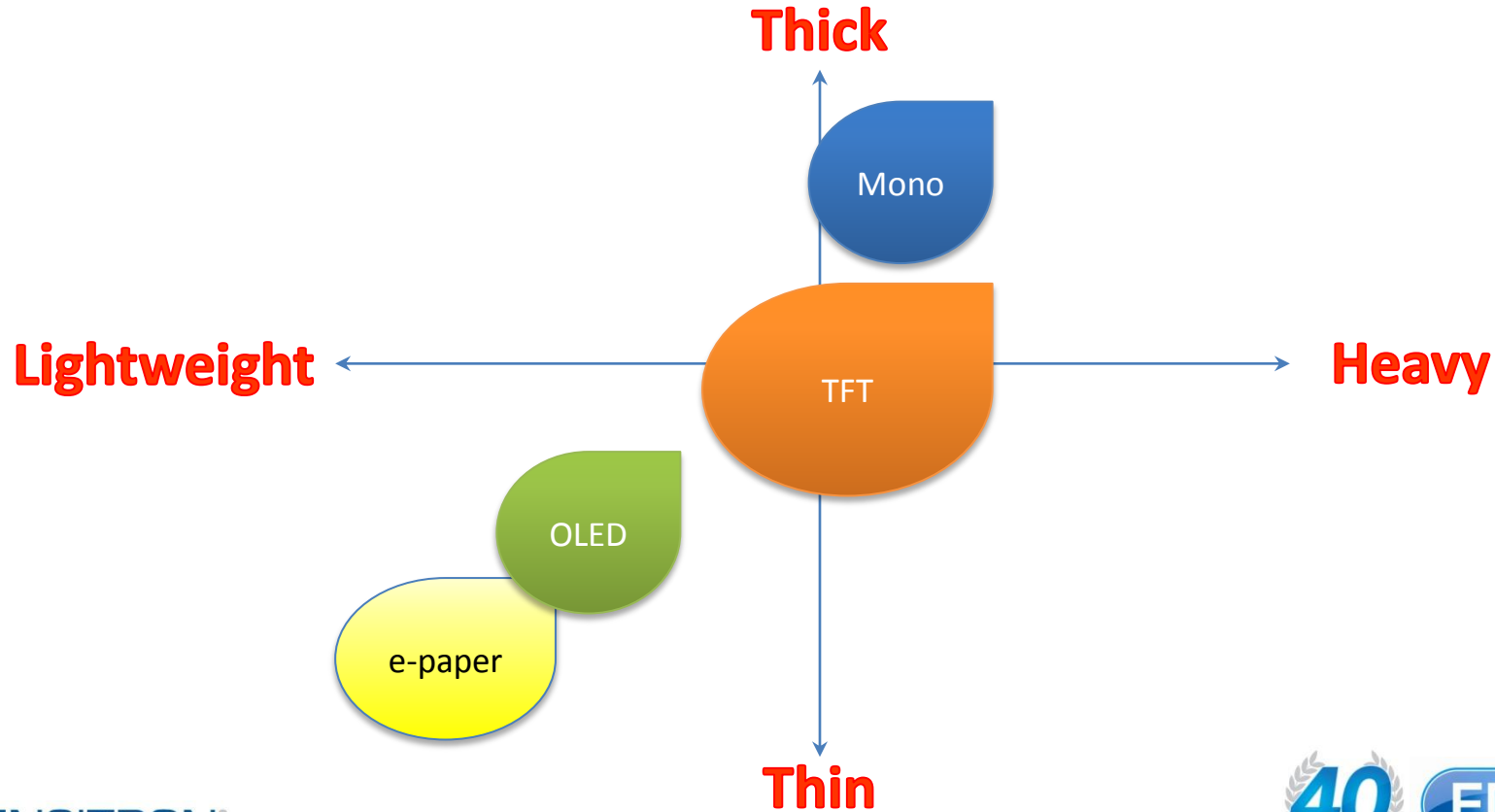




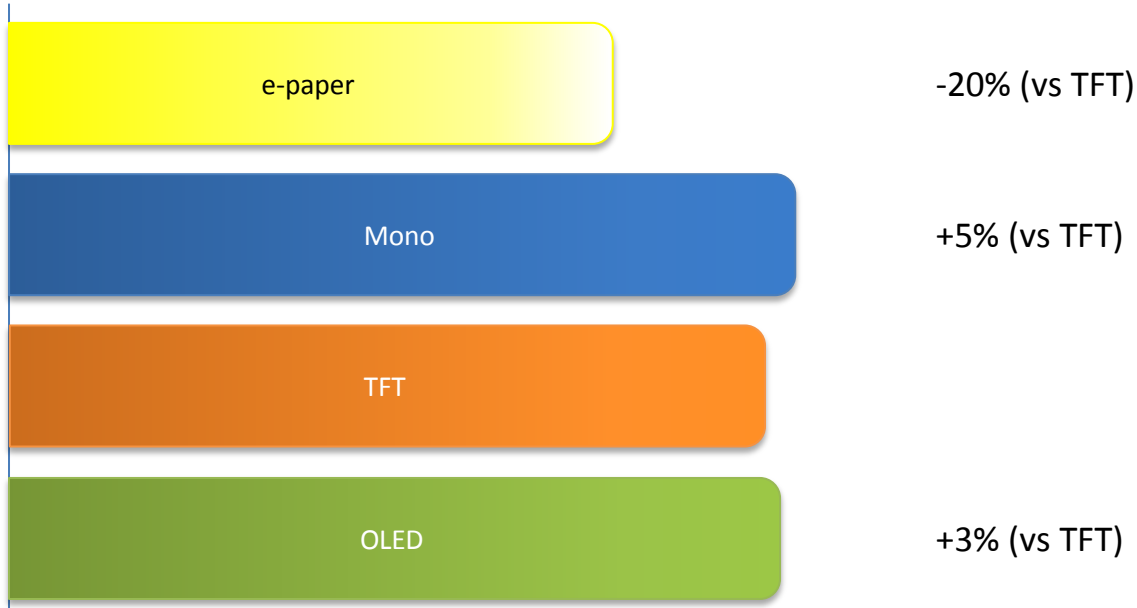
# Screen Size



# Mechanical Footprint



# Relative Cost for 2.8" Display



# Case Study 1: IPS TFT

## Ship Modelling and Simulation

### The challenge

A simulator desk requires high resolution colour screens positioned at different orientations, and visible from any viewing direction

### Why IPS TFT

High colour saturation, wide viewing angle and absence of colour shift makes it ideal for tile configuration

### Why Densitron

A off-the-shelf Smart IPS-TFT with HDMI and PCAP touch



## Case Study 2: TFT

### Veterinary Ultrasound

#### The challenge

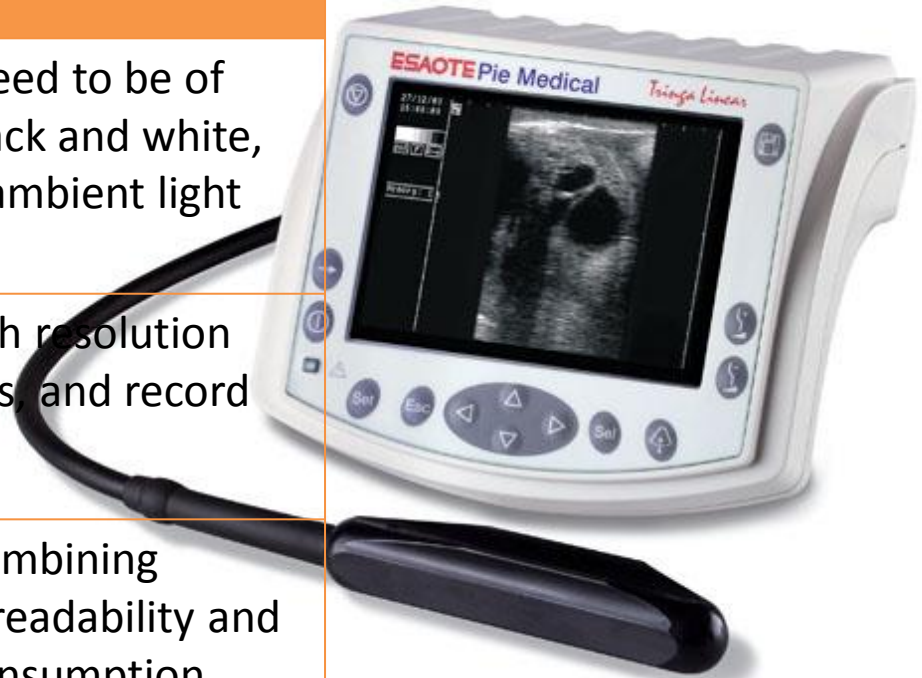
Scanned images need to be of high definition, black and white, and visible in any ambient light condition

#### Why TFT

Ability to show high resolution grey scales pictures and record live feed

#### Why Densitron

Unique product combining excellent sunlight readability and very low power consumption



## Case Study 3: E-Paper

### Airline Luggage Tag

|               |  |
|---------------|--|
| The challenge | Replacement of sticky paper airline luggage tag with a bar code readable, low-power display  |
| Why E-Paper   | High pixel density and reflective contrast suit various bar code scanning technologies. Ultra low power and image retention meet re-usability requirements |
| Why Densitron | Engineered the electronics solution that update the tag from a smart phone   |





## Case Study 4: OLED

### Personal Gas Detection

|               |  |
|---------------|--|
| The challenge | Clear and instant reading of gas data from any viewing direction and ambient light condition, on a battery driven hand-held device |
| Why OLED      | Versatility through vivid images, excellent contrast, widest viewing angle, and low power.consumption                              |
| Why Densitron | 10-year experience in providing customers with OLED solutions  |



## Case Study 4: Mono LCD

### Engine Management System

|               |  |
|---------------|--|
| The challenge | Custom display resolution and size, sunlight readable, and operating within -30°~85°C  |
| Why Mono LCD  | Mature and cost-effective technology suitable to customisation, automotive grade operating temperature and fully sunlight readable |
| Why Densitron | Design, development and production of the whole IP67 unit  |



# TFT GUI Support Tools: RipDraw Smart TFT

**RipDraw™**  
Web Portal



**RipDraw™ Emulator**



**RipDraw™ TFT**



- Layer Drawing
- Images Asset Library
- Touch Map Definitions
- User Account Management

Login →



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# TFT GUI Support Tools: RipDraw

**RipDraw™**  
Web Portal



**RipDraw™** Emulator



**RipDraw™** TFT



- **TFT based Slide Show**
- **Loading of Asset Library to RipDraw TFT**
- **Runtime Prototyping**



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# TFT GUI Support Tools: RipDraw

**RipDraw™**  
Web Portal



**RipDraw™** Emulator



**RipDraw™** TFT



- Robust Graphical Processing Unit
- Stateless Rendering Engine
- RipDraw Protocol Based Accessibility

for details on the RipDraw TFT product line and availability  
please contact our Platinum Sponsors Densitron Technologies  
directly.

**Contact** →



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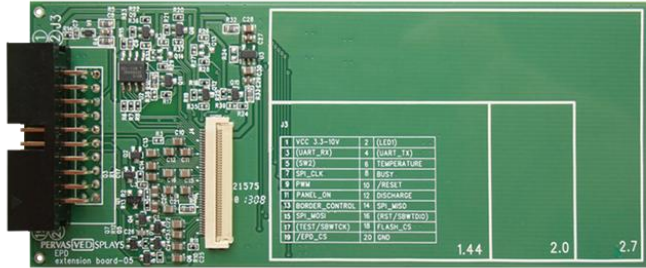
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**DENSITRON®**  
DISPLAYS

Office presence in Taiwan to manage factory relationships and provide client support



# E-Paper GUI Support Tools



## Extension board + 1.442, 2.0" or 2.7" display

- Complete schematic and PCB project open source
- Includes break out cable
- Row of 2.54 mm pitch headers
- Quick-start guide





# E-Paper GUI Support Tools

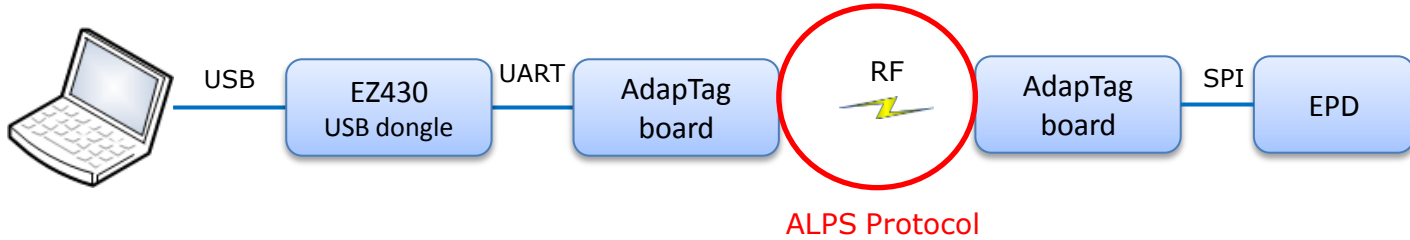
## Extension board + Ti MSP430 Launchpad

- Launchpad already programmed with firmware for Epaper extension board
- Complete SW project open source
- Complete schematic and PCB project open source
- Includes USB cable and quick-start guide





# E-Paper GUI Support Tools



EZ430 USB dongle  
(1 pce)



AdapTag board  
(4 pcs – 1 programmed as  
Host and 3 as Slaves)



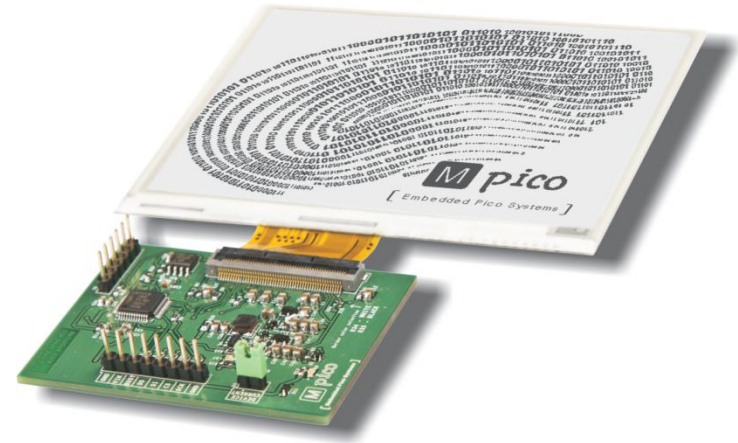
CR2450 battery  
(3 pcs)



MSP430 USB debug interface  
(excluded)



# E-Paper GUI Support Tools



- Fully featured display driving solution
  - TCON
  - Display DC/DC converter
  - Nano-amps stand-by current
- Supports 1-bit display driving
- SPI slave interface to host system
- Standardized communication interface allows
- easy exchangeability among display sizes

# E-Paper GUI Support Tools

## How it works in 3 easy steps

1.



### Connect

Configure your Densipaper device to connect to your existing Wi-Fi network

2.



### Update

Login to the webportal to Create, edit & upload images on the database

3.

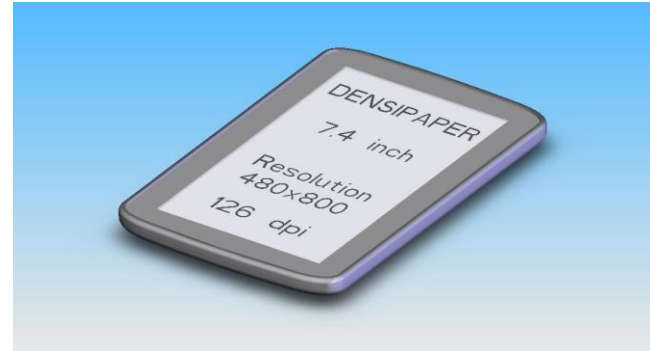
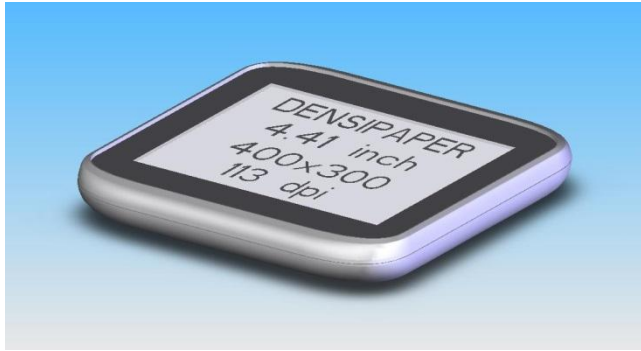


### Display

New images are displayed instantly next time each of your devices connect to the server

# DENSIPAPER

# E-Paper GUI Support Tools



- Uses existing Wi-Fi network
  - Runs on AAA alkaline batteries
  - 6 to 12 months without changing batteries
- \* polling every 30 minutes with 5 image updates per day.*

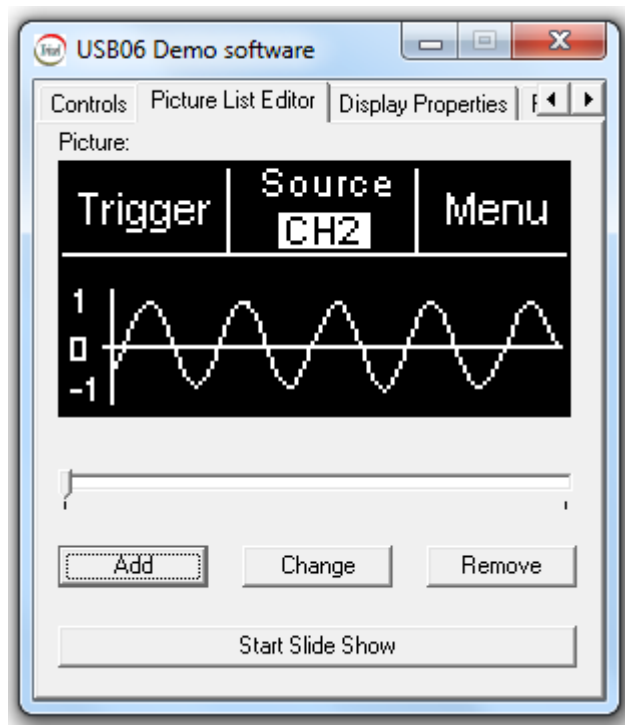
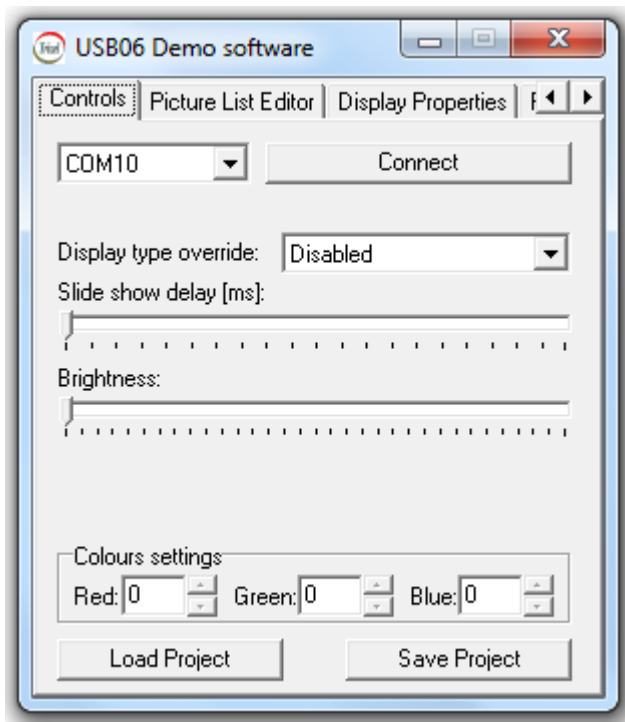
- Hotels, hospital bedrooms, doctor surgeries and Government buildings
- Art Galleries, Libraries and Museums
- Meeting rooms and Conference centres
- Educational establishments (schools, colleges, universities)

# OLED, Mono GUI Support Tools

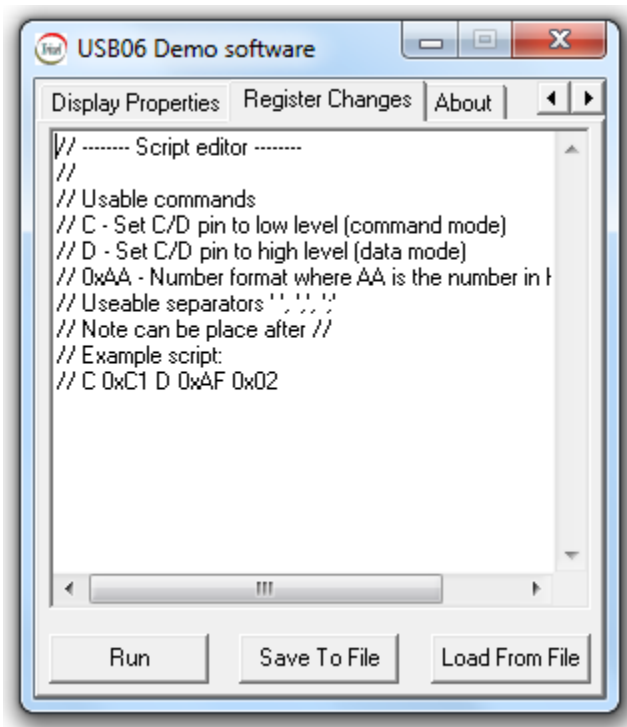
- Hot pluggable, up and running in minutes
- Drives OLED displays from the USB port of a PC
- Allows to display JPEG images & build slideshows
- USB Controller Card common for all the available DUO kits



# OLED, Mono GUI Support Tools



# OLED, Mono GUI Support Tools

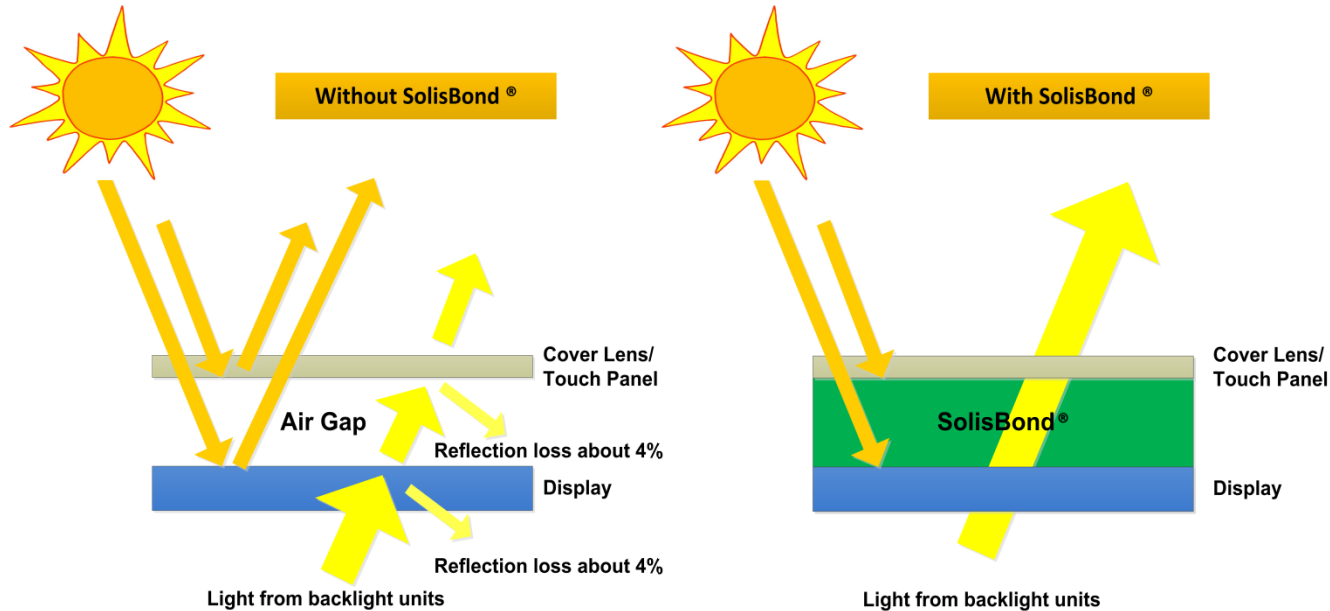






# Optical Enhancement: SolisBond® Optical Bonding

Why? A ***must have*** for applications requiring sunlight readability and or durability





# SolisBond® Optical Bonding

## Key Benefits

### Improved Readability

Decreases reflection on the display from external light source, hence improves the contrast ratio

### Improved Luminance

Reduces light loss from backlight units, thus increasing luminance of about 8%

### Resistance to shock

Adhesive is soft and not brittle, and provides better adhesion between display and touch panel / cover lens

### Enhance durability

Prevents water condensation between cover lens (or touch panel) and display.

Eliminates the "greenhouse effect"

### Reworkable

High yield

No damage to display, cover lens or touch panel

Hence Cost efficient

No UV curing required

# Brief touch on Display Technology Trend

- Penetration of plastic TFT substrate to allow Flexible, Wearable displays
- LTPS-based TFT substrate to accommodate Ultra High Definition, low power screens
- Colour E-Paper



Source: [http://e-ink.com/display-products\\_triton.html](http://e-ink.com/display-products_triton.html)

Source: <http://blogs.cio.com/mobilewireless/17711/samsung-introduces-flexible-display-youm>

ANY QUESTIONS ?



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