Five TFT Module Industry Reveals

1. The Fallacy of Standard Products.
2. Does Glass Size Impact Cost of TFT Glass?
3. Touch Panels: Don’t Take it for Granted?
4. Stacking Method for Best TFT Performance
5. Using Modularity to Optimize TFT Modules

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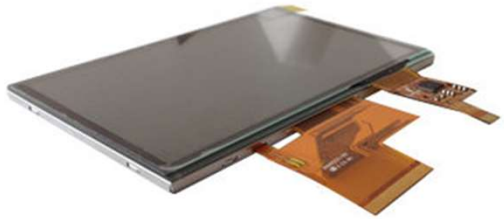

Display Industry's Insider Reveal #1

Standard TFT Modules are a Fallacy
TFT Modules are Sold as Standards but
Don't Count on Drop-In Replacements

Reveal #1

There is No Such "STANDARD" TFT MODULE

What Organization(s) Set Standards and Certify Standards?

Duplicity of Products from one Manufacturer to another is virtually impossible if Mechanical, Electrical, Visual and/or Performance are important.

- A Practice dating back to the 1980s has any Custom Module is made available to the industry by calling it Standard. A more Accurate description for a so-called Standard Module is "Pre-Tooled Modules."
- This misleading practice has caused major problems for OEMs seeking to cross Part Numbers from one "Standard" to another.
- OEMs are Lulled into Complacency until they seek out a second source is identical to the Form, Function and Appearance of the Standard Module they originally designed-in.
- Surprise to all, there are NO Agencies or Organizations who is Responsible to Validate "Standards" for the Display Industry. Hence there is no such supplicated standard.
- Worthy to note: Online Standard Product inventory may be aged 10 years or more and are most like riddled with EOL components.. OEMs who are not aware of the misinterpretation of "Standards" may design in a Display Module, test it and perhaps certify it only to find out that Standard Part Number is no longer available.

Display Industry's Insider Reveal #2

Size Matters but not necessarily for TFT Glass Pricing

Reveal #2 – TFT Glass

The cost of TFT Glass does not proportionally follow the size of the TFT Glass.

Unbeknownst to many Design Engineers there are common irregularities of TFT Glass Pricing. As example, a 5” TFT glass is More Expensive than a 7”…and an 8” is more expensive than 10”…etc.

- The logic of cost of TFT Glass driven by size does not apply to TFT Glass.
- Instead, TFT Glass cost is impacted by the global usage. The more popular the size, the more TFT Glass foundries build this size leading to more competition among the TFT Glass Foundries and thus lower unit pricing.
- Many TFT Glass pricing variances exist in today’s Marketplace.
- In addition to Popularity of a particular TFT Glass, Pricing will widely fluctuate due to seasonal Supply and Demand pressures.
- TFT Glass is the most expensive component in a TFT Display Module and it Drives the TFT Module Unit Price. Smart design strategy will result in lower TFT Display Module unit costs.

Display Industry's Insider Reveal #3

Touch Panel Design Negligence

Reveal #3 – TP Negligence

Touch Panels are typical overlooked and taken for granted.

Since any defects of the design are not visibly noticeable, Touch Panels are assumed to be in working order with no further concern for testing.

However, Touch Panels can not be properly validated unless worst case conditions specific to the Application are introduced in Touch Panel testing.

- Touch Panels are typically sold by Manufacturers as Industry Standards.
- Most Designers do not fuss with the Parameters of the Touch Panel which include Sensitivity, Resistance to Disruptive Bombardment such as EMI, RFI, Magnetic Fields, Moisture, Glove Applications….etc.
- Like all Sub-Systems of a TFT Display Module, Touch Panels have an Infinite number of design possibilities using varied Materials and Components.
- To Properly Validate a Touch Panel design, tests should be performed under all possible conditions the Panel will be subject to in the Application.
- Modification of Touch Panels once Testing is performed not Complex and likely will have no Tooling Charges. This includes adjustments in Algorithms, Mechanical Shielding, Material Adjustments and other methods to Reduce Emittance of Interference coming from other Sub-Systems within the TFT Module.

Display Industry's Insider Reveal #4

Techniques to Optimize the Display Viewing Performance is Often Overlooked since the merits of this Technique is not Widely Known.

Reveal #4 – Stacking Sub-Systems and Improving Visual Performance

The Pivotal Design decision to Transform a TFT Display from Ordinary to Outstanding is in the method of "Stacking" Sub-Systems.
i.e.: Cover Lens, Touch Panels, TFT Glass & Backlight.

The age-old method is to Stack each sub-system with a space in between each layer. The more effective method is to use OCA (Optical Clear Adhesive).

By Stacking with spaces, light from ambient sources will bounce around in the spacing area. In turn, light from Backlights will also bounce around causing washout of display information and a loss of clarity.

OCA eliminates all spurious light bounces and thus Clarity is increased, and Elimination of Shadowing is accomplished.

- The best method of Stacking Sub-Systems is to implement OCA.
- Besides attenuating stray light, OCA will ensure condensation will not occur in the Spacing areas between the Sub-Systems.
- Here is an illustration to compare Stacking using Spacing Method vs. Optical Clear Adhesives.

Display Industry's Insider
Reveal #5

TFT Display Modules Designed under the Modularity Approach are Inherently
Optimized to specific Applications
without Tooling or Engineering Fees

Reveal #5: Modularity allows for Optimization

A TFT Display Module is made up several Sub-Systems such as TFT Glass, Touch Panel, Backlight, IC Drivers, Electronic Circuits, Cables/Connectors...etc.

Through Modularity Methods, of Design and Assembly, each Sub-System, is Totally independent of every other Sub-System.

- Since the Sub-Systems are independent of each other, the TFT Module performance can be Optimized by modifying each Subsystem in accordance with the specific Application, Environmental Conditions and User Interface.

- Sub-Systems do not necessary need Tooling to reach Optimization. In most cases, Optimizing can be achieved through proper selection of material and components.

- Each Subsystem has a myriad of existing material and Components effectively enabling full Display Optimization.

- Besides TFT Glass, Visual Performance is Greatly Dependent on Materials, Backlighting Techniques, Surface Stacking Strategies and Light Enhancement Films. And the employment of OCA Stacking methods adds to the beauty of the Display.

- Display Module Optimization does not necessarily require Tooling and/or Engineering Charges.

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Summarizing the Five Industry Reveals

1. A “Standard” TFT Module is a Fallacy
2. Cost of TFT Glass is not Dependent on Size
3. Touch Panels need Application Specific Design Focus
4. Optimizing TFT Modules is Inherently Simple
5. “Modularity” allows easy TFT Module Optimization

For more information…

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