Focus on Displays

March 2017
AZ Displays, manufactures and markets a broad line of TFT panels and LCD modules, with an established reputation as a provider of top quality display solutions in a wide range of industry applications - combining sophisticated design and engineering capabilities, in standard and customized versions, and at very competitive pricing.

Why AZ Displays?

1. Established manufacturer of industrial display products:
   TFT’s with integrated resistive/PCAP touch 7 inch and under, wide range of character and graphic LCD modules.

2. Fully owned China assembly manufacturing (clean room facilities, state-of-art process and quality controls) – vertically integrated with global sales and distribution.

3. High automation level drives ability for very competitive pricing at lower volumes.

4. Sophisticated design capabilities and strong engineering support focus:
   - EMEA and China engineering and development support.
   - Designer-friendly website support with comprehensive engineering resources including 3D CAD, datasheets, dimensional drawings, quick-scan parameter, easy to navigate digital catalog.
   - Advanced development tools include universal development AND production board.

Click on image for link: [http://www.azdisplays.com/e-catalog/](http://www.azdisplays.com/e-catalog/)
TFT Displays Integrated Solutions include:

- 1.77” - 10.4” TFT Glass
- Brightness range: 250 - 1300nits (Sun readable)
- MCU/RGB/LVDS/MIPI interface options to meet your application requirement
- Resistive/Capacitive TP - optional
- Control Board
- LOCA Optical Bonding (TFT+TP) - optional
Touch Panel Options

**Capacitive Touch Panel**
- Better touch sensitivity
- Multi-touch is available
- More precise on touch
- Longer life time
- More user-friendly
- Need to consider EMI effect of device in the design process
- 2.8” - 10.4”

**Resistive Touch Panel**
- Can be touched with a pen and other substance
- Better anti-interference
- Lower Cost
- Multi-touch is not available
- Need periodical calibration
- No impact by EMI and better environment endurance
- 1.77” - 10.4”

**PCAP TP Technical Structure**

[Diagram showing the technical structure of a PCAP touch panel]
Benefits of Value-Added Optical Bonding

**Reflection in Sunlight**
- Non Optical Bonding: Reflection 4.2%
- With Optical Bonding: Reflection 0.4%

**Reflection in Backlight mode**
- Non Optical Bonding: Luminance loss 4.2%
- With Optical Bonding: Luminance loss 0.4%
Benefits of Value-Added Optical Bonding

**TFT+TP without Optical Bonding**

- **Readability in Sun**: Reflection of sunlight (13.6% luminance) $\rightarrow$ mirror-image on the display $\rightarrow$ Reduce readability
- **Energy efficiency**: 8.4% luminance loss (reflection) in Backlight mode $\rightarrow$ Has to increase brightness of LED
- **Application environment**: Gap between the TP and TFT glass $\rightarrow$ penetrated by moisture $\rightarrow$ fogging and reduced readability, particularly in outdoor high humidity.

**TFT+TP with Optical Bonding (OCA /LOCA)**

- **Readability in Sun**: Reflection of sunlight only 0.4% luminance $\rightarrow$ Significant improvement on readability in sun (300%+)
- **Energy efficiency**: 0.4% luminance loss only in Backlight mode $\rightarrow$ Lower LED brightness and lower energy
- **Application environment**: OCA between the TP and TFT glass $\rightarrow$ Eliminate moisture penetration $\rightarrow$ Much better Readability, particularly high humidity outdoors applications
- **Improved durability**: Higher resistance to dirt & moisture and strengthened product structure
High Contrast Graphic Module (TFT displays)

Features of HC Graphic Module

- High quality TFT Display
- High contrast – better for outdoor applications
- Wide viewing angle
- Mono LCD controller, simple connection
- Free options for background/font color
- Zettler patented technology / Software compatible with mono LCM (easy and direct product replacement)
- 3.5” / 5” / 5.6” TFT glass

<table>
<thead>
<tr>
<th></th>
<th>MONO DISPLAYS</th>
<th>HC DISPLAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Color</td>
<td>Background</td>
<td>Free option</td>
</tr>
<tr>
<td></td>
<td>White, Blue, Yellow/Green, Black</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Font</td>
<td>Free option</td>
</tr>
<tr>
<td></td>
<td>White, Black</td>
<td></td>
</tr>
<tr>
<td>Contrast Ratio (typ.)</td>
<td>Not more than 10:1</td>
<td>Higher than 400:1</td>
</tr>
<tr>
<td>Operating Temperature°C</td>
<td>-20 ~ 70</td>
<td>-30 ~ 85</td>
</tr>
<tr>
<td>Storage Temperature  °C</td>
<td>-30 ~ 80</td>
<td>-30 ~ 85</td>
</tr>
</tbody>
</table>
Roadmap (TFT/OLED)

<table>
<thead>
<tr>
<th>Size</th>
<th>Available</th>
<th>Scheduled</th>
<th>Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.4&quot;</td>
<td>10.1&quot; TFT / CTP LVDS interface 1024X600</td>
<td>10.4&quot; TFT / CTP MIPI interface 800*600</td>
<td>12.1&quot; TFT / CTP LVDS interface 1280*800</td>
</tr>
<tr>
<td>10.0&quot;</td>
<td>9.0&quot; TFT / CTP LVDS interface 800X480</td>
<td>9.0&quot; TFT / CTP MIPI interface 800*480</td>
<td>10.1&quot; TFT / CTP LVDS interface 1280*800</td>
</tr>
<tr>
<td>9.0&quot;</td>
<td>7.0&quot; TFT / CTP LVDS interface 1024X600</td>
<td>7.0&quot; TFT / CTP MIPI interface 800*480</td>
<td></td>
</tr>
<tr>
<td>8.0&quot;</td>
<td>7.0&quot; TFT / CTP LVDS interface 1024X600</td>
<td>7.0&quot; TFT / CTP MIPI interface 800*480</td>
<td></td>
</tr>
<tr>
<td>7.0&quot;</td>
<td>7.0&quot; TFT / CTP LVDS interface 1024X600</td>
<td>7.0&quot; TFT / CTP MIPI interface 800*480</td>
<td></td>
</tr>
<tr>
<td>7.0&quot;</td>
<td>5.6&quot; HC To cross mono 320X240</td>
<td>5.6&quot; HC To cross mono 320X240</td>
<td></td>
</tr>
<tr>
<td>7.0&quot;</td>
<td>5.0&quot; HC To cross mono 320X240</td>
<td>5.0&quot; HC To cross mono 320X240</td>
<td></td>
</tr>
<tr>
<td>5.0&quot;</td>
<td>4.97&quot; OLED MIPI Interface 720X1080 250nits</td>
<td>5.0&quot; HC To cross mono 240X128</td>
<td></td>
</tr>
<tr>
<td>5.0&quot;</td>
<td>5.0&quot; HC To cross mono 240X128</td>
<td>5.0&quot; HC To cross mono 240X128</td>
<td></td>
</tr>
<tr>
<td>5.0&quot;</td>
<td>4.3&quot; TFT / CTP MCU interface 480X272</td>
<td>4.3&quot; TFT / CTP MCU interface 480X272</td>
<td></td>
</tr>
<tr>
<td>5.0&quot;</td>
<td>2.8&quot; TFT RGB/MCU interface 240X320 / 280nits</td>
<td>2.4&quot; TFT MCU interface 240X320 250nits</td>
<td></td>
</tr>
<tr>
<td>4.3&quot;</td>
<td>&lt;3.5&quot; TFT Customized FPC &amp; Backlight</td>
<td>2.2&quot; TFT MCU interface 240X320 280nits</td>
<td></td>
</tr>
<tr>
<td>3.5&quot;</td>
<td>3.5&quot; HC MCU interface</td>
<td>2.2&quot; TFT MCU interface 240X320 280nits</td>
<td></td>
</tr>
</tbody>
</table>
LCD/TFT Solutions

Sample Applications

Security Monitoring Systems
ATM0500D12-T

Electronic Test Equipment
ATM0700D6C-T

Climate Controls
Custom Glass
Sample Applications

Fitness Equipment
ATM0700D6B

Automotive/Engine Controls
ATM0700D6J-CT, ATM0700L6L-CT

Credit Card Reader
ATM0430D12-CT
Sample Applications

Irrigation Controls
ATM0430D19A

Modular HMI control/visualization systems
ATM0700L6L-CT

Remote Alarm Monitoring System
ACM1602K-FL-YBS
**AZ Displays development and ‘production’ board**

- A technically robust and versatile engineering tool.
- Provides engineers with seamless integration of visual approval/display selection process and application programming/GUI development.
- Multiple evaluation options for TFT sizes 4.3”, 5.0”, 7.0”, brightness 200-1000 nits, resistive or PCAP touch.
- Does not require separate SBC/connectors/interfaces and avoids time consuming initialization coding for smaller to medium industrial applications/programming tasks.
- Ideal for applications with limited complexity and limited programming resources, smaller production runs.
Display Manufacturing

- ZETTLER Displays manufacturing division in Xiamen, China has implemented sophisticated process and quality standards including ISO 9001:2008.
- Key quality tools include APQP / DFMEA & PFMEA / SPC / MSA / PPAP, and testing on a 100% basis. Our production processes are lead free and RoHS compliant and feature clean room facilities (class 1,000 and 10,000 rooms).

http://www.azdisplays.com/az-displays-production-video/