



### Color TFT-LCD Module Enhancements

#### General Description

IDE provides optically enhanced solutions to standard manufacturer's displays including all major brands and sizes. The enhancements are in categories including brightness, readability, environment, protection and interface. The part# convention is to list the LCD model followed by a (-) then followed by the enhancement code. Note the following chart.

#### Brightness

**“P”** = Passive brightness requiring no changes in neither electronic components nor current. This process may include a number of light management materials (reflective polarizers, efficient light pipes, light reflectors, etc.).

**“F”** = Trans F lective effect allowing a transmissive LCD perform like a transfective LCD in direct sunlight while maintaining the transmissive attributes.

**“A”** = Active brightness requiring changes in electronic components and/or current. The “A” enhancement may also include the “P” enhancement depending on the application and price/performance requested. If several versions are requested the “A” & “P” may be both used = **“PA”**. The “A” enhancement is generally used with edge-lit applications.

**“AD”** = Active brightness utilizing heat **“D”** defeat material or technique that prevents MOIRE effects, NEWTON rings and other optical distortions caused by high heat influence on the active enhancement.

**“DB”** = Direct Backlight system that replaces the original standard edge-lit version. The **DB** creates a greater depth product with additional lamps in a new metal box attached to rear of LCD. Brightness can often exceed 1,500 nits depending on LCD and size. Both **“P”** & **“DB”** can be used in conjunction.

**“L”** = Lamination used with materials not normally laminated in order to meet application quality requirements.

#### Readability

**“R”** or **“RG”**= Readability value-add is an index matched Anti-Reflection or Anti-Glare material that also performs as a hard coat to protect the LCD polarizer and helps maintain a blacker “black” to perceive a high contrast ratio. The readability material is now available in 2 forms; Anti-reflection, and Anti-Reflection/Glare combo. Be certain to determine the appropriate material for the application and specify in your order.

**“WR”** = Wide-View enhancement. Many LCDs have inadequate viewing angles for a specific application. This enhancement increases the viewing angle either VERTICALLY or HORIZONTALLY to 140 degrees. The **“R”** is automatically included because the **“R”** is a hard coat protection. Therefore, the **“WR”** is the appropriate code.

**“RV”** = Restricted View Angle to 40 degrees in all orientations. This restriction can be useful for doctor's offices, testing facilities or anywhere data must be protected from prying eyes. Brightness management may be necessary.

**“B”** = Bonded touch screen; vandal shield or any other hard substrate to the LCD front to improve the readability of the LCD in various ambient lighting conditions, especially high bright.

#### Environment

Many value-add techniques and products are available. No codes are established. However, clients may create their own part numbers to create the code used. Thermal loading, heaters, coolers, parasitic effect controllers and other conditional environmental issues can be managed.

#### Protection

Vandal, EMI, RFI, water, dust and other conditions can be managed through materials (plastic, glass, metal) and engineering techniques (NEMA compliance, etc.). Codes are client controlled. EMI shielding is measured in OHMS per square inch. The lower the number, the greater the shielding but less transmissivity with slightly higher cost. **“L”** = Lamination is used where needed to meet application quality requirements.

#### Interface

Touch screens of various types and methods including active pen are available from many manufacturers to satisfy the quality but cost sensitive man-machine interface applications. In addition, is the value-add video interfaces and light controllers including flicker free digital/manual dimming controllers from sunlight to night vision including various filters and techniques. Tilt switches, programmable dimming, ambient light sensors and more are available. Codes are client controlled.