



GLOSSARY OF TERMS



S-Tek Inc.

Active Matrix LCD: Individual pixels of the display are controlled by thin film transistors, which are deposited directly onto the glass substrate. Each pixel is therefore driven in a static mode, resulting in very high contrast and viewing angle.

Annunciator: A word or special symbol which is driven as a single segment

Array Process: Method of manufacturing whereby displays are arranged in rows and columns on a large laminate, and separated after they are filled with LCD fluid.

Backplane: The common electrode connection. There can be multiple backplanes in a multiplexed display.

Chip-on-Board (COB): Popular IC mounting method that provides wire bonding as the direct attachment of bare die to laminated printed circuit boards. The LCD driver is formatted into an area on the PCB. Electrical connections are made by micro diameter gold wires. The entire area is then covered with epoxy.

Chip-On-Glass (COG): High-tech mounting methods that uses Gold Bump or Flip Chip IC's, and implemented in most compact applications. Chip-On-Glass integrated circuits were first introduced by Epson. In flip-chip mounting, the IC chip is not packaged but is mounted directly onto the PCB as a bare chip. Because there is no package, the mounted footprint of the IC can be minimized, along with the required size of the PCB. This technology reduces a mounting area and is better suited to handling high-speed or high-frequency signals.

Common Plane: See Backplane

Contact Ledge: The area along the edge of the parts where electrical connections are made.

Contrast Ratio: The ratio of the luminance between the dark and light areas of the display.

Dual in Line Pins (DIL): Two rows of pins attached along parallel sides of a display.

Direct Drive: A method of driving a display whereby individual segments are driven from separate edge connections.

DSTN: Was the first commercial black and white conversion of the STN display and refers to Double Super Twisted Nematic. DSTN displays are actually two distinct STN filled glass cells glued together. The first is a LCD display, the second is a glass cell without electrodes or polarizers filled with LC material for use as a compensator which increases contrast and gives the black on white appearance.

Electronically Controlled Birefringence (ECB) or Vertically Aligned Nematic (VAN): is a electro-optical effect that was first described in 1971. Through this effect a number of distinct colors can be displayed in a LCD.

Elastomeric Connectors: A thin conductive material used to make connections between an LCD and a PC board.

First Minimum: An LCD construction technique where the cell geometry is optimized for maximum contrast and viewing angle. The geometry is different for each LCD fluid.

Font: The style of a letter or digit.

FSTN: Film Compensation Super Twisted Nematic. LCD with an extra film added to the outside of the cell to compensate the color shift of blue on green to black on white. The film is made of a polymer with double refraction to remove the interference of colors. It results in retardation compensation.

Ghosting: A condition where segments which are in the "off" condition become slightly visible.

Heat Seal Connector: A thin flexible cable used to connect the LCD to the PC board.

Image Area: The total area bounded by the display characters

Ink Overlay: The process of applying opaque, colored inks to the display to provide colors, or highlight certain areas of annunciators.

Isocontrast Plot: Usually a polar plot showing contrast ratio versus viewing angle. The individual curves represent points of equal contrast.

Liquid Crystal Fluid: An organic material which has both liquid and crystalline properties.

Module: An LCD which includes a PCB, driver electronics, bezel, and possibly a backlight.

Multi-Color TN: Display is based on the negative mode. The color coatings and the black matrix (mask) are inside the LCD cell. The black mask allows the light go through characters and icons only, not the background. The total number of colors ranges from one to three in addition to the black matrix. Customers can select the color for each segment. No bleaching of colors is observed even when operating at 80 C, ideal for automotive and other outdoor applications.

Multiplex (Mux): A method of driving a display whereby multiple segments are driven from the same edge connection.

Negative Image: A display which has a dark background and lighter active segments, i.e. clear characters on a black background.

Pixel: An individual active segment.

Polarizer: A stretched polymer which transmits light in only one axis. A typical display has polarizers on the front and back.

Positive Image: A display which has a light background and darker active segments, i.e. black characters on a silver background.

Reflective: A viewing mode which uses ambient or other front lighting to provide the illumination for the display.

Segment: An active area within the display which can be turned on and off. This can be a single segment of a 7-segment character, an annunciator, or a pixel in a dot matrix array.

Surface Mounting Technology (SMT): Using quad flat packages on printed circuit boards was the most popular at the early years of liquid crystal display industry, and is still available for mass production.

Static Drive: See Direct Drive

Supertwist (STN): A type of display which uses fluids which "twist" greater than 90°. An STN display has improved viewing angles and contrast at high multiplex rates.

Tape Automated Bonding (TAB): LCD driver or controller electronics are encapsulated in a thin, hard bubble package, of which the drive leads extend from the bubble package on a thin plastic substrate. The adhesive along the edges is used to attach the TAB to the LCD glass and/or PCB.

Transflective: A viewing mode which can use ambient light or backlighting to provide the illumination for the display.

Transmissive: A viewing mode which cannot use any type of front lighting to provide the illumination for the display, it therefore must use a backlight.

Twisted Nematic (TN): A type of display where the liquid crystal fluid rotates the plane of polarization 90°.

Viewing Area: The area of a display which is visible through a bezel or cut-out in an instrument.

Viewing Angle: The preferred angle of viewing a display, usually described in comparison to a clock face, i.e. 12 o'clock for above the normal, or 6 o'clock for below the normal.