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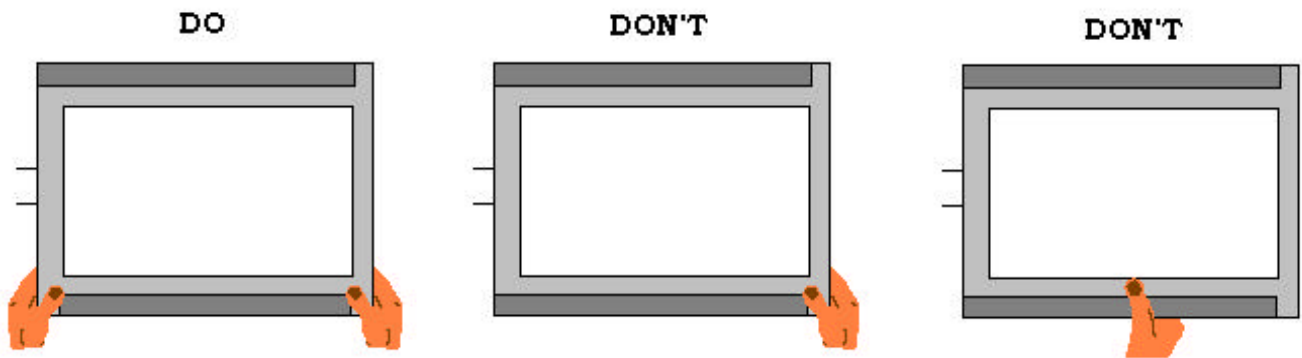
# **LIQUID CRYSTAL DISPLAY PRECAUTIONARY NOTES**

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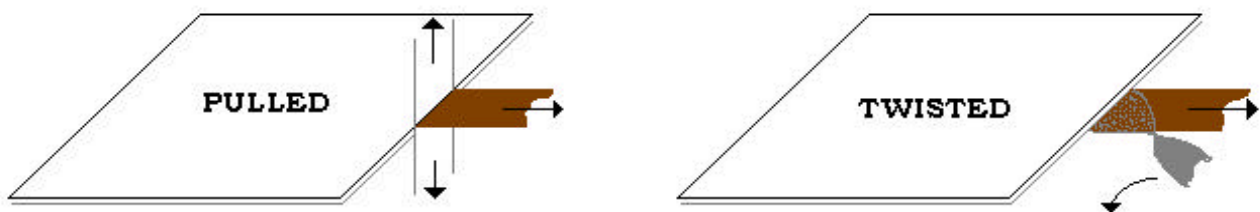
## PRECAUTIONS IN USE OF LCD:

Typical LCD life may be extended by following these simple precautionary measures. Normal life expectancy can range from 5 to 15 years. To ensure extended life please follow the guidelines below and practice common sense.

- I. **DO NOT** handle an LCD with bare hands. The use of anti-static gloves is recommended. This will prevent damage from static electricity and dirt.
- II. **DO NOT** handle LCD with only one hand. Using two hands will help to prevent chipping or breaking, and reduce pressure on the LSI chip protection cover.

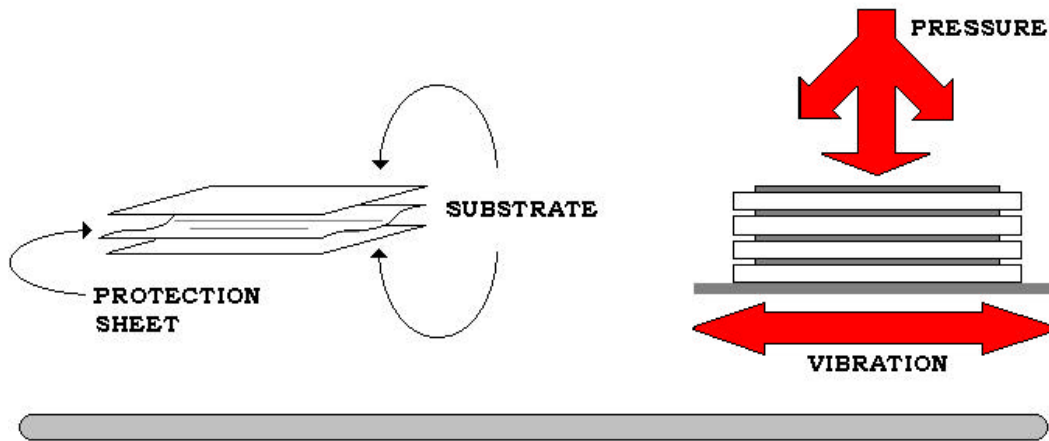


- III. **DO NOT** apply pressure to the interconnect area between the LCD and the FPC on FPC interconnect models. **DO NOT** pull or twist the FPC.

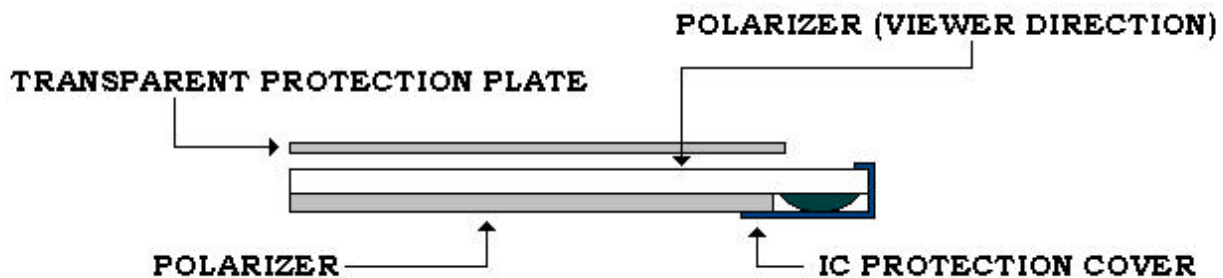


- IV. **ALWAYS** be certain that the power is "OFF" before making or breaking electrical connections.
- V. When stacking LCD's on top of each other **ALWAYS** sandwich a protection sheet between each LCD to protect the polarizers from scratching and dirt. When stacking:
  - 1) Stack no more than 5 LCD panels high.
  - 2) **DO NOT** push on the stack or rub the LCD's while stacked.**IF POSSIBLE, DO NOT STACK LCD's.**

## VI. Installation of the LCD



- A. Kyocera LCD's have LSI chips mounted directly onto the glass. Consequently special attention is required in the user's mechanical design and installation.
1. A transparent protection plate shall be added to protect the LCD and its polarizers.



2. The LCD shall be installed so that there is no pressure on the LSI chips or chipcover.
  3. The LCD shall be installed flat, without twisting or bending.
  4. The display window size should be the same as the effective viewing area.
- B. Voltage Operating the LCD ( $V_{op}$ ) and Display Quality
1. The viewing angle and contrast ratio of the LCD will vary according to changes in  $V_{op}$ . Therefore,  $V_{op}$  must be adjusted to optimize these critical parameters.

## VII. Static Electricity

- A. Since CMOS IC's are mounted directly onto the LCD glass, protection from static electricity is required.
1. Operators should wear ground straps.

2. Aluminum foil covering the terminal electrodes should remain in place until installed.
- B. Warranty does not cover electrostatic charges due to negligence.

#### VIII. LCD Operation

- A. The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.
- B. When switching “ON”, the sequence must be VDD first, then interface signals, and finally VEE. Consult the LCD specification for details.
- C.  $V_{op}$  must be adjusted to optimize viewing angle and contrast.
- D. Response speed will reduce when the low specified temperature limit is exceeded, and display color may change when the high-specified temperature limit is exceeded. These phenomenon are normal and temporary. They will recover and perform normally once returned to the specific operating environment. **(THESE PHENOMENON ARE NOT FAILURES.)**

#### IX. Storage

- A. The LCD shall be stored within the temperature and humidity limits specified.
- B. Store in a dark area, and protect the LCD from direct sunlight or fluorescent light.
- C. The LCD should be packaged to prevent damage.
- D. Protect the LCD from any possible condensation.

#### X. Screen Surface

- A. **DO NOT** store in a high humidity environment for extended periods. Image degradation, bubbles, and/or peeling off of polarizers may result.
- B. The front polarizer is easily scratched or damaged. Prevent touching it with any hard material, and from being pushed or rubbed.
- C. Water may cause damage or discoloration of the polarizer. Clean any condensation or moisture from any source immediately.
- D. Fingerprints may stain the polarizer. Always wear protective gloves or finger cots when handling the LCD.
- E. The LCD screen may be cleaned with a soft cloth or cotton pad. Methanol, or Isopropyl Alcohol may be used, but insure that all solvent residue is removed.
- F. The LCD’s major components are glass. Mechanical shock or stress may severely damage the LCD module. **HANDLE WITH CARE.**

- XI. Safety: Liquid Crystal is non-toxic by nature; However Kyocera recommends you immediately wash thoroughly any skin that may be exposed to liquid crystal if an LCD is broken or damaged.

