



# TERMS OF USE



# S-Tek Inc.

## HOW TO USE LCD MODULES

Liquid Crystal Display Modules (LCD) is composed of glass and polarizer. Pay attention to the items when handling.

- (1) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.
- (2) Do not touch, push or rub the exposed polarizers with anything.
- (3) N-hexane is recommended for cleaning the adhesives used to attach front/rear polarizer. Reflectors made of organic substances could be damaged by chemicals such as acetone, toluene, ethanol and isopropylalcohol.
- (4) When the display surface becomes dusty, wipe gently with absorbent cotton or other soft material like chamois soaked in petroleum benzene. Do not scrub hard to avoid damaging the display surface.
- (5) Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause deformation, color fading, and / or polarizer degradation.
- (6) Avoid contact with oil, fats or any greasy substance.
- (7) Condensation on the surface and contact terminals due to cold will damage, stain or dirty the polarizers. After products are tested at low temperatures they must be warmed up in a container before coming in contact with room temperature environments.
- (8) Do not place anything on or attach anything to the display area as this may leave marks or stains.
- (9) Do not touch the display with bare hands. This will stain the display area and degrade insulation between terminals. (Some cosmetics are detrimental to the polarizers).
- (10) As glass is fragile, it tends to become chipped during handling especially on the edge. Please avoid dropping or pressing.

## INSTALLING LCD MODULES

Holes in the printed circuit board are used to fix the LCD module. Attend to the following items when installing the LCD module.

- (1) Cover the surface with a transparent protective plate to protect the polarizer and IC cell.
- (2) When assembling the LCD module into other equipment, the spacer to the bit between the LCD module and the fitting plate should have enough height to avoid causing stress to the module surface. Refer to the individual specifications for measurements. The measurement tolerance should be 0.1mm.

## PRECAUTION FOR HANDLING LCD MODULES

Since the LCD module has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the modules or making any alterations or modifications to it.

- (1) Do not alter, modify or change the shape of the tab on the metal frame.
- (2) Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- (3) Do not damage or modify the pattern wiring on the printed circuit board.
- (4) Absolutely do not modify the zebra rubber strip (conductive rubber) or touch it with another object.
- (5) Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- (6) Do not drop, bend or twist LCD module

## ELECTRO-STATIC DISCHARGE CONTROL

Since this module uses a CMOS LS1, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC.

- (1) Make certain that you are grounded when handling LCD module.
- (2) Before removing LCD module from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential.
- (3) When soldering the terminal of LCD module, make certain that the AC power source for the soldering iron does not leak.
- (4) When using an electric screwdriver to attach LCD module, the screwdriver should be of ground potential to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.
- (5) As far as possible make the electric potential of your work clothes and that of the workbenches the ground potential.
- (6) To reduce the generation of static electricity be careful that the air in the working environment is not too dry. (A relative humidity of 50%-60% is recommended).

## PRECAUTIONS FOR SOLDERING TO THE LCD MODULE

(1) Observe the following when soldering lead wire, connector cable, etc. to the LCD module.

- Soldering iron temperature : 280 C 10 C.
- Soldering time : 3-4 sec.
- Solder : eutectic solder

If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation. (This does not apply in the case of a non-halogen type of flux.) It is recommended that you protect the LCD surfaces with a cover during soldering to prevent any damage due to flux spatters.

(2) When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

(3) When removing the electroluminescent panel from the PC board, be sure that the solder has completely melted or the soldered pad on the PC board could be damaged.

## PRECAUTIONS FOR OPERATION

(1) Viewing angle varies with the change of liquid crystal driving voltage.

(2) Driving a LCD in the voltage above the limit shorts its life.

(3) Response time is greatly delayed at temperatures below the operating temperature range. The display area becomes dark color at temperature above this range. However, this does not mean the LCD will be out of order. It will recover when it returns to the specified temperature range.

(4) The PCB eyelet, conductor and if the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

(5) Condensation on terminals can cause an electrochemical reaction disrupting the terminal circuit. Therefore, it must be used at the relative condition of 40 C, 50%RH.

(6) When turning on power, input each signal after the positive/negative voltage becomes stable.

## STORAGE

When storing LCDs as spares for some years, the following precautions are necessary.

(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for desiccant.

(2) Store them in a dark place; do not expose to sunlight or fluorescent light. Keep the temperature between 0 C and 35 C.

(3) The polarizer surface should not come in contact with any other object. (We advise you to store them in the container in which they were shipped).

(4) Environmental conditions:

- Do not have them for more than 168 hours at 60 C
- Should not be left for more than 48 hours at -20 C

## SAFETY

(1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

## LIMITED WARRANTY

Unless otherwise agreed between S-Tek Inc. and customer, S-Tek Inc. will replace or repair any of its LCD and modules which are found to be functionally defective when inspected in accordance with S-Tek Inc. LCD acceptance standards, for a period of one year from date of shipments. Cosmetic/visual defects must be returned to S-Tek Inc. within 90 days of shipment. Confirmation of such date is based on freight documents. The warranty liability of S-Tek Inc. is limited to repair and/or replacement on the terms set forth above. S-Tek Inc. will not be responsible for any subsequent or consequential events.

## INVENTORY PROGRAMS AND PAYMENT TERMS

All products on customer purchase orders must be taken within six months of the date of the order, unless otherwise agreed upon by S-Tek Management in writing, all products that have not been delivered and/or paid for become due in full upon demand.

## RETURN LCD MODULES UNDER WARRANTY

No warranty will be granted if the precautions stated above have been disregarded. Typical examples of violations are:

- Broken LCD glass
- PCB eyelets damaged or modified
- PCB traces damaged
- Over bending of any flexible PCB
- Circuit modified in any way, including addition of components
- PCB tampered with by grinding, engraving or painting vanish
- Soldering to or modifying the bezel in any manner

Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned in the original antistatic packaging together with sufficient description of the failures or defects.

Any connectors or cables installed by the customer must be removed completely without damaging the PCB eyelet's, traces and terminals. NOTE: Due to the dynamic changes in the industry, many devices are being upgraded with newer components. These components may have some different characteristics than the original components. We strongly suggest that you keep this in mind when designing any LCD into your systems. S-Tek Inc. is not responsible for these changes or any problems that may be incurred by these changes.