LCD Module

Precautions for LCM handling

Application note

LCM handling V 1.1

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Revision record

Table 0.1: Revision record

Rev.	Date	Chapter	Description
1.0	2013-04-23	all	initial release
1.1	2013-08-28	all	minor spellings

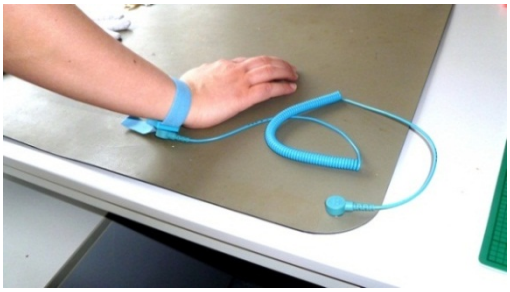
Table of content

1 Introduction

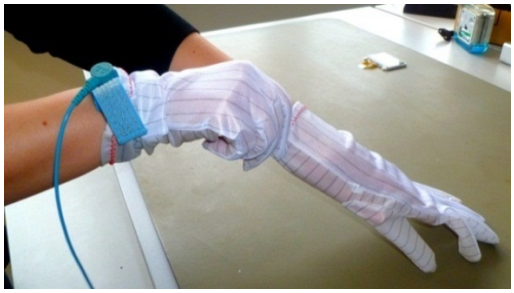
This document describes a collection of rules admatec has defined and collected over many years. Its purpose is to help customers best in handling LCMs correctly to avoid any malfunction of LCMs due to incorrect handling.
The display panel is made of glass and polarizer. As glass is fragile, it tends to or become chipped during handling especially on the edges. Please avoid mechanical shocks by dropping it and do not apply any excessive force on the surface. Operate LCMs within the specified ranges and do not tamper the printed circuit board.

1.1 Static electricity

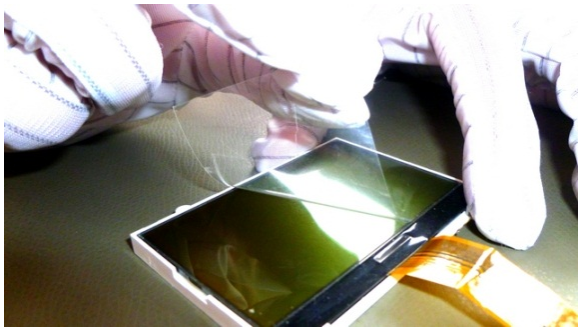
LCMs contain standard CMOS ICs. When handling an LCM, take sufficient care to prevent static electricity discharge as it would damage any CMOS IC.
The recommended relative humidity in the working area is 50-60%RH. Moreover, please pay attention to the following points:



Ground yourself with ground strap



Use antistatic gloves



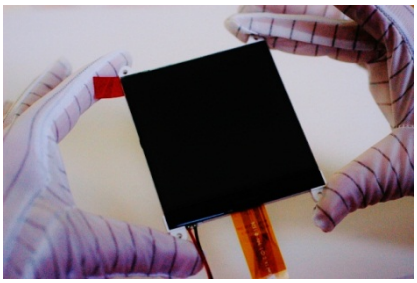
The modules are coated with a film to protect the display surface from contamination, adhesion of flux, etc. Remove the protective film slowly and, if possible, under ESD control device like ion blower. Abruptly removing could cause static electricity to be generated.

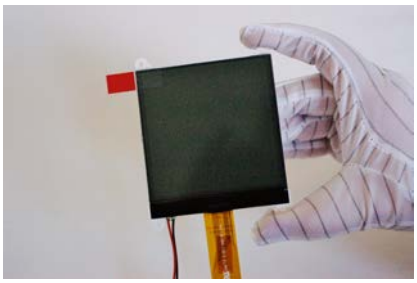
- Do not take the LCM from its anti-static bag until assembly. LCM's are individually packaged in bags specially treated to resist static electricity
- Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals
- The operators should use a ground strap when handling a LCM
- Assure that the workbench is properly grounded
- Always ground electrical equipment required for assembly

1.2 Handling of LCMs

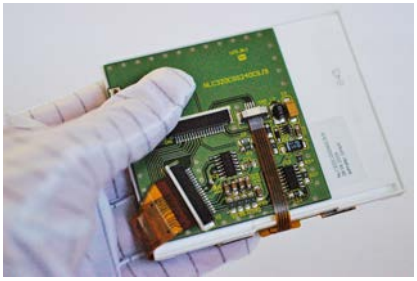
1.2.1 Correct handling

Please handle with anti-static gloves. Hold LCMs on LCM edges as they are easy to damage.

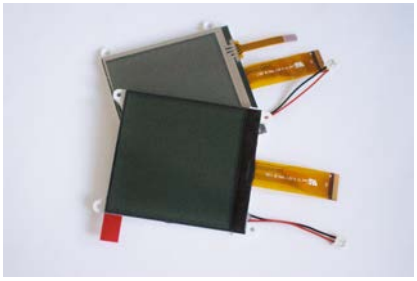




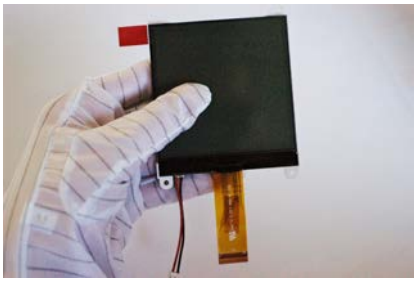
1.2.2 Incorrect handling



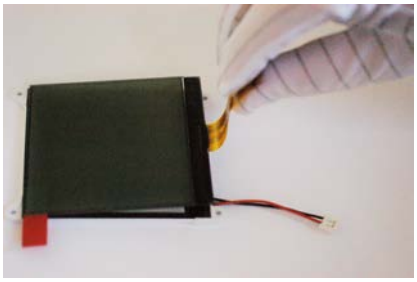
Don’t touch IC directly



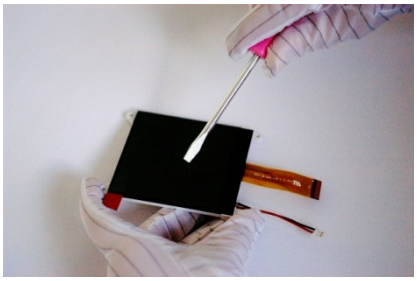
Don’t stack LCM



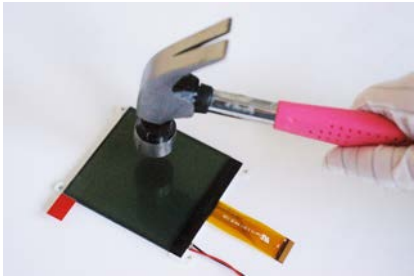
Don’t hold the surface of panel



Don’t stretch interface (like FPC)



Don’t use sharp tools on surface



Don’t use hard tools on surface

1.3 Soldering

The following procedures should be followed when soldering the LCM:

- Use soldering irons with proper grounding and no leakage.
- For hand soldering the temperature shall not be higher than 310±10°C and applied less than 3 sec per terminal.
- Limit soldering of the printed circuit board to I/O terminals only.
- Type of solder: Eutectic solder (rosin flux filled).

Note: Avoid using flux, because it could penetrate the module and the module may get contaminated during cleaning. Peel off protective film after soldering of the I/O terminals is done. By following this procedure, the surface contamination, caused by the dispersion of flux while soldering, can be avoided.

If soldering flux is used, be sure to remove any remaining flux after finishing the soldering operation (this does not apply in the case of a non-halogen type of flux.) Protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.

1.3.1 Re-soldering

Do not re-solder more than 3 times.

1.4 Cleaning

- When cleaning the LCMs surface, gently wipe it by using soft cloth moisten with solvent (Isopropyl alcohol, Ethyl alcohol or Trichlorotrifluoroethane).
- Solvents other than the above-mentioned may damage the polarizer. Especially, do not use water, ketone or aromatics. Wipe off water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.
- Do not wipe the displays surface with dry or hard materials because that will damage the polarize surface.
- Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns.
- Do not use the following solvent on the pad or prevent it from being contaminated: Soldering flux, Chlorine (Cl) or Sulfur (S).
- Do not use any detergent to clean mounted PCB after soldering, because the detergent can penetrate between the individual layers of the LCM, causing unwanted optical effects.

1.5 Mounting

When mounting the LCM, make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

1.6 Storage

Please follow the correct method of storage as otherwise deterioration of the display material (polarizer) and oxidation of the I/O terminal plating may take place and thus, the soldering process may become difficult.

- Store them in a sealed polyethylene bag. If properly sealed, there is no need for the desiccant.
- When storing, keep the LCM packed in the original bags, or store them in a container processed to be resistant to static electricity, or in an electric conductive container.
- Store in ambient temperature of 25±5°C, and keep the relative humidity of 50±10%RH.
- Store LCMs in the dark ambient. Do not expose LCMs to direct sunlight or fluorescent light.
- Store within the specified storage temperature range.
- Store in a clean environment, free from dust, active gas or solvent.
- The polarizer surface should not come in contact with any other objects. Store without any physical load.

1.6.1 Long-term storage

- Store in the shipping container.
- If the shipping container is not available, place LCMs in anti-static bags and seal the opening.

1.7 Precautions for Operation

Viewing angle varies with the change of liquid crystal driving voltage (V_{LCD}). Adjust V_{LCD} to show the best contrast. Sometimes V_{LCD} is referred as V_{OP}.

Drive LCMs within the specified voltage limit since the higher voltage can cause shorter LCM life.

The use of direct current to drive LCMs causes undesirable deterioration LCMs.
If the logic circuit power is off, do not apply any signals to the pins.
Please follow the power on/off sequences of the used controller to prevent damage on LCM.

Response time will be extremely delayed if ambient temperature is below operating temperature range and on the other hand, LCD's shows dark color at higher temperature. Those phenomena do not mean malfunction of LCM. LCM will recover once being back in the specified operating temperature.

Minimize the corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if one power cycle is applied.
Please keep the temperature within specified range for usage and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.

1.8 Safety

The liquid in LCMs is a hazardous substance. If any liquid crystal leaked out of a damaged LCM and encounter with your hands, do not lick or swallow. Wash it off immediately by using soap and water thoroughly.
Use acetone or alcohol to clean up liquid leaked out of damaged LCMs.