

TECHNICAL NOTE 37 - Handling Guidelines for Crystal and Crystal Oscillator Products



1. Introduction

This document provides guidelines for the handling of crystal or crystal oscillator products at the customer's location. It covers product handling from the time that it is received at the customer's dock and stored on the customer's shelf through removal from the shipping box, board soldering and depaneling / singulation, and installation on the customer's board in his final product.

Although this Tech Note provides handling guidelines for all crystal and crystal oscillator devices, IQD Statek crystals and crystal oscillators, which are designed and manufactured to be rugged and robust, should be better than the average crystal and crystal oscillator in the industry when subjected to mishandling. (Please refer to IQD Statek device datasheets for details).

For clarification of any specific issues regarding product handling covered or not covered in this document, please contact us at info@iqdfrequencyproducts.com

2. General Handling Guidelines for all Crystal and Crystal Oscillators

Crystal and oscillator products are designed and manufactured to survive certain shock levels. These levels are indicated in the "Specifications" section of the product datasheet. Exceeding these shock levels as a result of handling or manufacturing process steps may cause changes to the electrical characteristics and/or actual breakage of the device.

In order to protect and ensure solderability, Statek recommends our standard products to be stored at a temperature of 15 C to 35 C, and a humidity of 25% to 85% RH.

3. Cleaning of All Crystal and Crystal Oscillators

Ultrasonic cleaning of the crystal has been reported by some customers to cause damage to, or, in extreme cases, cause breakage of the crystal. This damage or breakage can take place in both low frequency and high frequency crystals. For this reason, we recommend our customers to exercise caution when performing ultrasonic cleaning of our devices, and try to first verify that such a cleaning process does not damage the devices.

4. Pick and Place Machines

In cases where an auto assembly or a pick and place machine is used to place the parts from a tray or from a reel onto the board, it is recommended that the speed of the arm of the machine be adjusted, and that the machine be properly programmed for deceleration and for device height, so as to avoid damaging the part due to the impact of the head when it places the part. The use of a soft or rubber clad tip also helps eliminate any damage to the device.

5. Handling of Printed Wiring Boards for All Crystal and Crystal Oscillators

Any board shearing, bending, twisting, vibration, or similar forces should be minimized during the board manufacturing / soldering process, in order to reduce the risk of damaging the device.

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Any such issues are potentially exacerbated in cases where the PC board panel includes more than a certain number of boards (for example, 25 to 30 boards).

Since part of the force introduced to the panel by the board population process is transferred to all the boards on the panel, in cases where there are a large number of boards per panel, the cumulative vibrational effect transferred to the last few boards on the panel may prove to be excessive.

6. Handling of Individual Crystal and Crystal Oscillators

In cases where individual boards, crystals, or crystal oscillators are mishandled or dropped on the factory floor, devices experience a certain level of shock. This shock level depends on a number of factors, such as the height from which the device was dropped, how hard it was dropped, the mass and surface area of the device, and the surface material of the floor on which the device was dropped. If dropped on the floor, depending on the above-mentioned factors, the device may experience a shock level exceeding that specified in the device datasheet. Care in handling printed wiring boards, crystals, or crystal oscillators is advised, in order to eliminate any potential problems caused by mishandling or dropping them.

7. Operator Proficiency Program

IQD Statek recommends that customers familiarize themselves with the contents of, and consider placing their operators through the J-STD-001 Training and Certification Program which

is an Industry Consensus Training and Certification Program established by the Institute for Interconnecting and Packaging of Electronic Circuits (IPC). The following website provides further details of his program, and lists the American and European companies that are IPC Licensed J-STD-001 Certification Centers: [IPC International, Inc.](http://www.ipc.org)

8. Soldering Precautions

For a recommended solder reflow profile for IQD Statek surface mount crystals and oscillators, please refer to IQD Statek Tech Note 27.

Customers are advised that, in cases where the crystal is hand soldered to the printed wiring board, excessive heat introduced to the product during the hand soldering process can potentially melt the preform used to attach the id of the product to its package, and also has the potential to damage the lid, the package, and, in extreme cases, cause malfunction of the device.

References:

[IQD Statek Tech Note 27](#)

[IQD Statek Datasheets](#)