

Quartz crystal handling notes

lead cutting:

One sensitive part in pin type crystals is the glass isolator section. Mechanical stress during lead bending or lead cutting can create micro cracks in the glass. The wire must be mechanically fixed between the bending or cutting point and the glass area. Do not cut or bend the wire at less than 3.0 mm distance from the base plate. Jauch offers a cutting service for all pin type crystal types. Do not solder the crystal housing, use rubber glue or SMD clips to fix the housing.

mounting:

Taped HC49/U crystal in pin type versions should not be used in automatic pick-and-place systems if the crystal frequency is higher than 10.0 MHz in fundamental mode or higher than 30.0 MHz in 3rd overtone mode. The blanks are sensitive and can break easily through mechanical stress or vibration. The crystal base of pin type parts should lie completely on the pc-board in case of vertical mounting. Any open distance can damage the glass sealing during shock or vibration influences. Isolation spacers are available to avoid short circuits.

soldering:

All pin type crystals are suitable for the standard wave soldering lines. SMD versions of leaded crystals and genuine surface mount crystals can be used for reflow soldering versions like infrared-convection reflow or vapor phase reflow. The crystal frequency can change by a few ppm after the soldering process. This change will recover after a few hours or days without any damages.

cleaning:

Crystals can be cleaned with conventional cleaning methods. Ultrasonic cleaning is acceptable up to 20 kHz. Higher frequencies can destroy the crystal blank. The ultra sonic conditions can change according to different pc-board sizes and weights. Cleaning tests from the customer side will then avoid any further damages.

Quartz crystal test conditions

1. visual inspection:	IEC 61178-1
2. shock:	IEC 60068-2-27, 100g, 6 ms, half sine pulse, 3 x per axes
3. vibration (sinusoidal):	IEC 60068-2-6 test B1, 10 Hz ~ 55 Hz amplitude = 0.75 mm, 55 Hz ~ 2 kHz, 10g, 1 octave per minute, 2 hours each direction
3. solderability:	IEC 60068-2-20: test Ta (235°C ± 5°C method 1, test Tb method 1A, 5 s
4. sealing:	IEC 60068-2-17, test Qc, test Qk
5. bump:	IEC 60068-2-29, 4000 bumps per axes, 40g, 6 ms
6. temperature:	IEC 60068-2-14, test Na, 10 cycles, extremes of operating temperature range
7. aging:	IEC 61178-1 part 4.9.1, standard: 30 days at 85°C, IEC 61178-1 part 4.9.2: 1, extended aging: 1000 h, 2000 h, 8000 h at 85°C

Crystal oscillator test conditions

1. shock:	DIN IEC 68-2-27 Test Ea, 100g, 6 ms, half sine wave, 3 bumps in main directions
2. vibration:	DIN IEC 68-2-6 Test Fc, 10 ~ 500 Hz, 10g, 2 hours in main directions
3. humidity:	DIN IEC 68-2-3 40°C/93% RH for 21 days
4. solderability:	CECC 008 02 - 7.2.1 infrared reflow condition