



# Tech Info Library

## Macintosh Plus: Effects of Extreme Cold

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### TOPIC -----

What are the long-term effects of storing a Macintosh Plus in extreme cold (-40 degrees) for an extended period?

### DISCUSSION -----

Here are the operational and non-operational (storage) condition specifications for the Macintosh Plus:

#### Temperature

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	Degrees Fahrenheit	Degrees Celsius
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Operating	50 to 104	10 to 40
Storing	-40 to 122	-40 to 50

#### Humidity

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All conditions: 5% to 90% relative humidity

#### Altitude

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0 to 4615 meters  
0 to 15,000 feet

If you expect the Macintosh Plus to be at -40 (F or C) for a long period, especially if there are occasional dips significantly below -40 degrees, you may encounter some, all, or none of these conditions:

- Possible thermal stress of the electrolytic capacitors to the extent that they crack, leak, or fail when thawed.
- Possible thermal stress of the fiberglass/epoxy resin of the circuit boards, leading to hairline fractures of the printed circuit board.

- Possible thermal stress of the CRT, leading to hairline fractures of the glass.
- Possible thermal stress of the cables inside the Macintosh Plus, leading to hairline fractures of the insulation or conductor.
- Possible thermal stress of the junctions inside the integrated circuits caused by the variation in thermal expansion of the plastic case and the metal wires.

Any of these scenarios can lead to failure of one or more parts of the system. We recommend that you keep the Macintosh Plus in a closet or in some other heated living quarters. If this is not an option, after removing the system from this extreme temperature, allow the Macintosh Plus to return to a normal operating temperature slowly, possibly over a period of days. By allowing the components to warm gradually, if there hasn't been any irreversible damage, the system should be fine.

If the capacitors have cracked, you may notice some fluid dripping down the left side of the case or some discoloration in this area. In that case, or if the system behaves erratically or you hear crackling or popping on startup, shut down the system immediately and take it to your authorized service center for examination.

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