# ESD

**PROTECTION**

**SUSCEPTIBILITY**

## What is ESD?

ESD (Electrostatic Discharge)
A familiar form of Electrostatic Discharge, often called “static electricity”, is the shock we receive after walking across carpet. In a technical environment, ESD can be very costly by harming devices or components.

## Preventing ESD

Prevention is the best defense against ESD and the first step of prevention is to understand the source. Improper handling is the number one cause of ESD. A semiconductor device can be damaged just by being handled before it is plugged in. Good ESD practice, the key to ESD prevention, is to keep all electronic components and yourself at the same electrical potential. This usually means ground potential or zero volts. Maintain a habit of "grounding" yourself to the equipment chassis whenever you attempt a repair. There are times when it is not practical, or convenient, to wear a ground strap. As long as you and the equipment are at the same potential it should be OK. Touch a part of the metal chassis before removing devices. When handling the PCB, make sure that you always handle the circuit board by the edges. When grounding yourself to any equipment, the hazard of electric shock is present.

## Good ESD Practices

The following guidelines will help in preventing ESD damage:

- Use good grounding practices.
- Be especially careful when wearing synthetic clothing while working with circuit boards. Clothing made of synthetics (polymers) will generate static charges while clothing made of cotton will not.
- Store parts in anti-static bags.
- Never place unprotected boards in plastic containers.
- Always touch the metal chassis before handling parts.
- Handle boards by the edges.
- Prevention is the best defense.

## Why worry about ESD?

ESD does not have to be seen (a spark) to do damage to electronic components during handling. If the damaged component fails immediately, the result can be a board that fail tests and requires rework. This represents lost production and additional manufacturing costs. Worse than this, a component may be partially damaged and weakened. It may suffer a change or drift in characteristics. It may remain within specification, but fail later when in use by a customer. It has been estimated that 90% of damaged devices may be discovered in this way. This is the most expensive type of failure.

## Responsibilities of all Personnel

All personnel handling sensitive devices have a responsibility to be aware of the ESD threat to reliability of electronic products. They have prime responsibility to implement and maintain ESD prevention measures. Field work is perhaps the most risky situation of handling ESD sensitive devices because of the uncontrolled nature of the environment. It is also often the most neglected aspect of ESD damage prevention. Faulty circuit boards required for failure analysis must be packaged in ESD shielding packaging if further ESD damage is to be avoided.