



DEALER SERVICES INC.

# ESD AWARENESS AND PRECAUTIONS



Electro Static Discharge or ESD is the release of stored energy (static electricity) between two points with different potential voltages. When dealing with Printed Circuit Boards (PCB's) this exchange of static electricity can critically damage the board or lead to intermittent failures. Special precautions should be used whenever handling PCB's and subassemblies that contain components that are ESD-sensitive, which include transistors, diodes, integrated circuits (IC's), laser diodes, electro-optical devices, film resistors, capacitors and especially memory devices. Over the years, electronic devices have gotten smaller and faster, their susceptibility to ESD has greatly increased.

There are many ways to control and/or reduce the effects of ESD. The most valuable resource is the knowledge and awareness of the individuals that come in contact with these devices. There is vast amount of information on the subject of ESD control.

Static electricity is most commonly created by friction or separation. The amount of static electricity generated depends on the materials subjected to the friction or separation. Another factor is the amount of humidity in the air. Low humidity (dry air) will increase the amount of static charge created. As a person walks across a room, a static charge is created. The amount of charge depends on the type of shoes the person is wearing, the type of surface the floor is made of and the amount of humidity in the room. Based on these variables, the voltage created could be as low as 250 volts or as much as 35,000 volts. Most boards can be damaged or harmed with a voltage of 30 volts or more, while hard disk drive components can be harmed with less than 10 volts. Below is an example of the amount of voltage generated while performing common tasks:

|  |                      |
|--|----------------------|
| Walking across carpet                  | 1,500 - 35,000 volts |
| Walking across vinyl tile              | 250 - 12,000 volts   |
| Working at a bench                     | 700 - 6,000 volts    |
| Sheet Protectors for work instructions | 600 - 7,000 volts    |
| Picking up a poly bag                  | 1,200 - 20,000 volts |
| Chair with urethane foam               | 1,500 - 18,000 volts |

If a static shock is felt while coming in contact with another object, the voltage transfer is in excess of 3,000 volts!

**The use of a wrist strap is one of the most effective means to reduce the chances of ESD damage to a PCB, especially for a field technician.** Neutralizing the potential voltage differences to a common point ground will prevent damage to the board. Wrist straps should be used at all times by the Field Engineer (FE) while handling PCB's. Also, once the PCB is removed from the protective packaging, the FE should reduce the amount movement while handling the unprotected board.

### Field Measures to Control ESD

- Awareness
- Use ESD mats and **wrist straps** when installing/removing PCB's
- Transport circuit boards in ESD bags or cases
- Minimize movement while handling an unprotected boards
- Place only the board in ESD protective packaging – other objects such paper or plastic bags generate ESD that can damage the board

To learn more about ESD and ESD protection, go to [www.esda.org](http://www.esda.org), or for more information, training materials or a complete list of Field Service Products contact Hytec Dealer Service, Inc. at 1.800.883.1001 ext. 3021