

PRIORITY:	Normal
DATE:	March 13, 2002
TITLE:	Preventing Electrostatic Discharge (ESD) Damage
ECO REFERENCE:	N/A
PRODUCT(S) AFFECTED:	All
SUMMARY:	The dangers associated with electrostatic discharge damage can be prevented by following static control procedures.

Introduction

Static electricity is an electrical charge caused by the imbalance of electrons on the surface of an electrical component. Electrostatic Discharge (ESD) is the transfer of this charge, which can damage an electrical component. Because Adaptive signs contain EPROMs, print circuit boards (PCBs), and other static-sensitive devices, proper grounding techniques are required to remove charges before dangerous levels of static can build up.

This document shows how to prevent ESD when working with Adaptive equipment. For additional and more specific information on controlling ESD, see the Electrostatic Discharge Association Web site at <http://www.esda.org/aboutesd.html>.

Safety guidelines

Grounding, the act of balancing the electrical charge between yourself and a sign or electrical component by touching metal on either, must take place prior to and throughout any service procedures. To further minimize the potential for ESD damage, do the following:

- Always turn off power before removing or inserting electrical components.
- Limit direct hand contact by holding electrical components at their edge and using handling tools to pry them from their sockets.
- When possible, use a static-free surface, such as an anti-static mat, to do your work.
- Never slide static-sensitive devices across any type of surface—friction creates static.
- Keep styrofoam, plastics, and other static-generating material away from your work area. Generally, any non-conductive (non-metal) material can be static-generating.
- If you leave your work area and then return, repeat any procedures used to ground yourself before picking up where you left off.
- Be aware that ESD increases in the winter when there is less moisture in the air.

Adaptive signs are designed to be grounded whether they are on or off. However, if the wiring is disconnected, the signs are no longer grounded and you are not protected.

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Due to continuing product innovation, specifications in this manual are subject to change without notice.

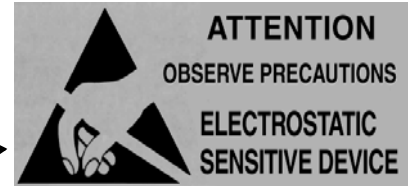
Protective packaging

Electrical components must always be moved or stored in an anti-static bag to provide protection against static electricity. Each bag must be marked with an ESD packaging label, indicating the component inside is static-sensitive and that appropriate caution must be taken when handling. All bags must be grounded prior to opening to remove any potential charges.



Always transport or store ESD devices in an anti-static bag.

Mark each bag with the appropriate packaging label.

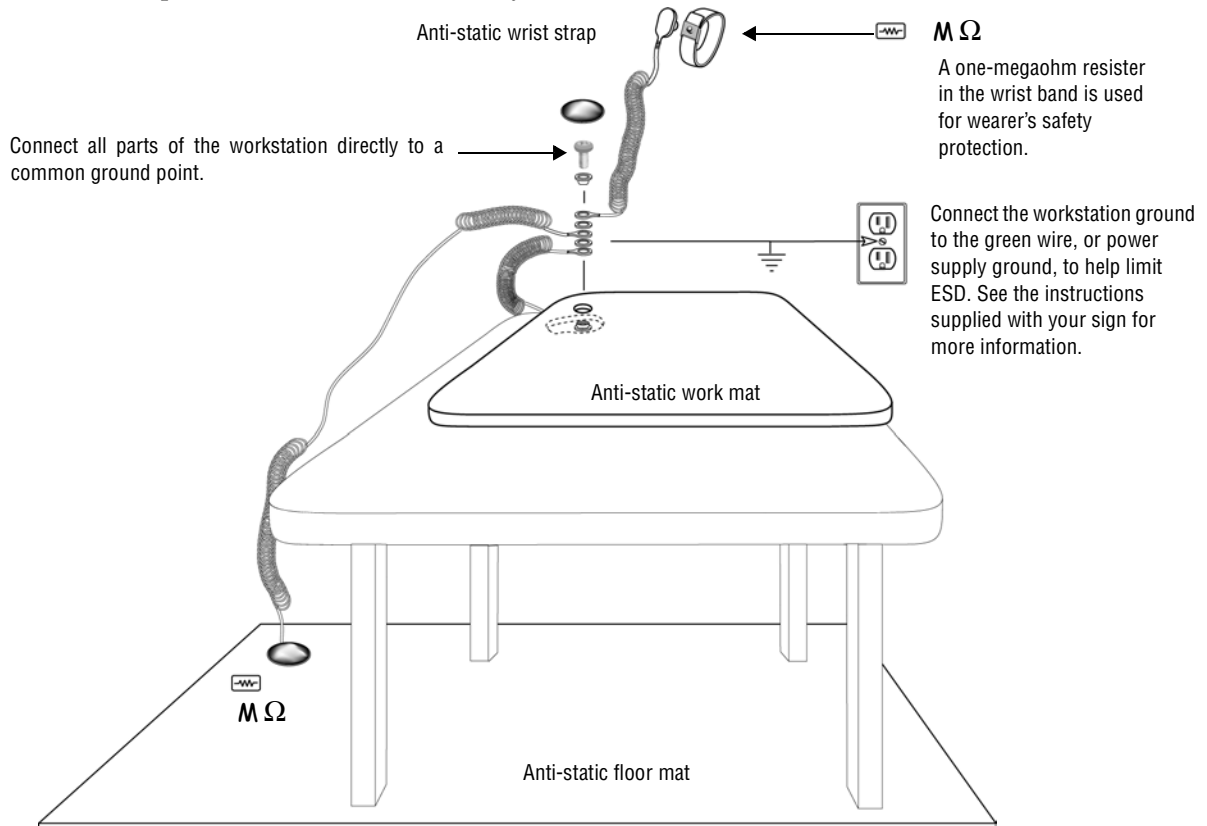


Follow protection guidelines whenever you see the ESD symbol or anytime the inside of a sign is exposed. Never assume the situation is safe if the label is missing. ESD can damage circuit traces on any circuit board.

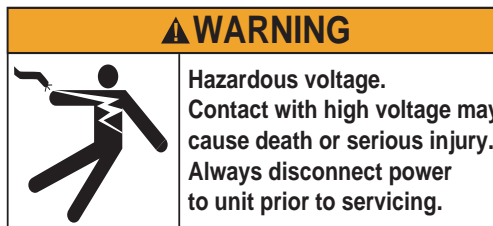
Preventing ESD

With an ESD-protected workstation

If at all possible, every service procedure performed on a sign should be carried out at an ESD-protected workstation. These workstations have a common ground point between the static-protected work surface and the personal grounding protection (such as a wrist or heel strap, or static mat) that effectively limit ESD.



1. Remove power to the sign.



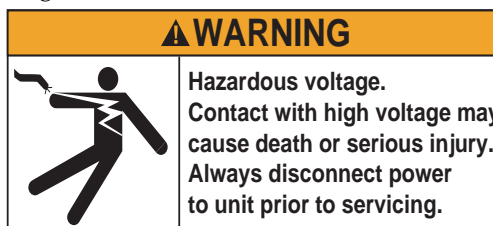
2. Place the wrist strap on your wrist and wait a moment to ensure proper grounding.
3. Begin working on the sign.

NOTE: Before removing any component stored in an anti-static bag, set the bag on the anti-static mat, then turn it over to dissipate any charge on the outside of the bag. Do the same thing to the component inside.

In the field

If an ESD-protected workstation is not available, do the following to effectively protect both yourself and the electrical component with which you are working:

1. Remove power to the sign.



2. Put on a wrist strap. If no personal body protection is available, touch your finger to a metal surface and skip to step 4.
3. Connect the wrist strap to a piece of metal on the sign itself, then wait a moment to ensure proper grounding.
4. Before opening the sign, touch the sides of the sign's case to discharge any remaining static electricity.
5. Using alligator clips and a jumper wire, connect the component with which you are working to the wrist strap. If you are working without a wrist strap, connect the jumper wire to a piece of metal on the sign itself.
6. Begin working on the sign.

NOTE: Before removing any component stored in an anti-static bag, hold the bag in one hand while touching a metal surface with the other hand to dissipate any charge on the outside of the bag. Do the same thing to the component inside.

There may be extenuating circumstances that require additional or alternate steps, such as when you are on a ladder or truck. In these instances, grounding yourself or any tools you use is difficult. To reduce the possibility of any static discharge, handle components as little as possible and hold parts at their edge.

