STANDARD OVERHAUL PRACTICES MANUAL

HANDLING OF ELECTROSTATIC DISCHARGE SENSITIVE DEVICES

PART NUMBER NONE

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STANDARD OVERHAUL PRACTICES MANUAL

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To: All holders of HANDLING OF ELECTROSTATIC DISCHARGE SENSITIVE DEVICES 20-12-02.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

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Location of Change	Description of Change
	NO HIGHLIGHTS

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A = Added, R = Revised, D = Deleted, O = Overflow

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Revision		Filed	
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STANDARD OVERHAUL PRACTICES MANUAL

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Temporary Revision		Inserted		Removed	
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Temporary Revision		Inserted		Removed	
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INTRODUCTION

1. General

A. The instructions in this manual tell how to do standard shop procedures during maintenance functions from simple checks and replacement to complete shop-type repair.

B. This manual is divided into separate sections:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) Effective Pages

(5) Contents

(6) Revision Record

(7) Record of Temporary Revisions

(8) Introduction

(9) Procedures

C. Refer to SOPM 20-00-00 for a definition of standard industry practices, vendor names and addresses, and an explanation of the True Position Dimensioning symbols used.

D. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.

E. If the component overhaul instructions are different from the data in this subject, use the component overhaul instructions.

HANDLING OF ELECTROSTATIC DISCHARGE SENSITIVE DEVICES

1. INTRODUCTION

A. The data in this subject comes from Boeing Process Specification BAC5485. The airline has a copy of the Boeing Process Specification Manual.

B. The data is general. It is not about all situations or specific installations. Use this data to help you write minimum requirements.

C. Refer to SOPM 20-00-00 for a full list of all the vendor names and addresses.

2. GENERAL

A. Many electronic line replaceable units (LRUs) contain microcircuits and other devices which can be damaged internally by electrostatic discharges. These units are identified as Electrostatic Discharge Sensitive (ESDS), by one or more of these:

(1) The words Electrostatic Discharge Sensitive, Static Sensitive, ESD, ESDS

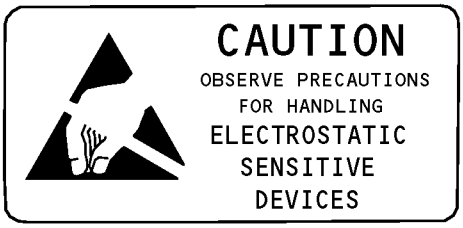
(2) Yellow on the edge of the circuit board or ejector clip

(3) A special symbol or label (usually black and yellow) (Figure 1)

B. Your body, and the tools you use, can collect electrical energy from many items. Without precautions, you can send this energy through an ESDS device which could permanently damage it. One touch could make the device or component unserviceable. You cannot usually see the energy or the damage.

C. The energy can come from your clothing, the floor, the furniture, the equipment, or electrical fields in the air. The precautions send the energy to ground and keep it away from the ESDS devices.

D. Examples of ESDS parts are microcircuits, discrete semiconductors, film resistors, integrated circuits, hybrid devices and piezoelectric crystals. Typical types include Metal-Oxide-Semiconductor (MOS), such as Complementary MOS (CMOS), P-MOS, N-MOS, insulated gate field effect transistors (IGFET), or Schottky TTL microcircuits.



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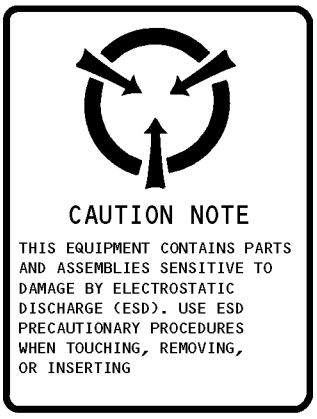

BACL26L

PREFERRED LABELS FOR BOEING EQUIPMENT

ELECTRONIC INDUSTRIES
ASSOCIATION (EIA)
RS 471

MIL-STD-129

COMMERCIALLY
AVAILABLE

INDUSTRY-STANDARD SYMBOLS

Electrostatic Discharge Sensitive Identifiers
Figure 1

3. EQUIPMENT

A. Do operations with ESDS items on a special grounded workbench which includes a grounded wrist strap for the person. Typical configurations are shown in BAC5485. If a wrist strap cannot be used, use special static-controlled floor coverings and grounded tools.

B. For safety, the wrist strap must have a resistance to ground of 250 kilomns - 1.5 megohms. The wrist strap must touch the bare skin.

C. The work surface must be of static dissipative material (BAC5485 Type II, which has a surface resistivity of greater than 105, but not greater than 109 ohms per square.) A metallic work surface can be used, but this increases the risk of electrical shock. The surface must have a maximum resistance to ground of 1012 ohms.

D. Antistatic shop clothing of cotton, antistatic nylon, or some other approved material, must be worn by all persons in the ESDS protected area. (BAC5485 gives typical examples.) All buttons must be fastened. The antistatic clothing must completely cover all personal clothing.

E. The soldering irons and vacuum desoldering equipment used on ESDS items must have the electrical properties shown below. To make sure, do tests on the equipment per BSS7339.

(1) Controller switching (transient voltage) – less than 500 millivolts peak

(2) Pulse energy – less than 0.1 microjoules. This is not applicable to equipment which use controlled metallurgy to keep the temperature constant, such as Metcal units.

(3) Magnetic field energy – less than 0.5 gauss

(4) Steady state leakage – less than 2 millivolts rms (50-500 Hz); less than 75 millivolts rms (above 500 Hz)

(5) Resistance, tip to ground – less than 20 ohms

F. All electrical equipment must be grounded, or must not generate more than 100 volts when tested with a static meter. If the equipment includes a cathode-ray tube (such as an oscilloscope or computer monitor) and generates more than 100 volts, keep ESDS hardware a minimum distance away of 1 meter while the equipment is on or switched on or off.

4. HANDLING PRECAUTIONS

A. Do not touch an ESDS part or assembly unless you are grounded by a wrist strap or heel straps.

B. When you touch an ESDS part, touch the body of the part first before you touch the wires or leads.

C. If an ESDS part has the protection of conductive foam or a wire across the leads, do not remove this protection until immediately before you install the part.

D. Give ESDS parts and assemblies the protection of a conductive or static dissipative container or cover when not in work. BMS 15-15 bags are recommended.