



**707, 727-787**  
**STANDARD WIRING PRACTICES MANUAL**  
**ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION**

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### ELECTROSTATIC SENSITIVE DEVICE IDENTIFICATION

#### 1. GENERAL DATA

##### A. **Electrostatic Discharge (ESD)**

Electrostatic charges:

- Are generated when surfaces of different materials come into contact
- Are stored on the surfaces of physical objects; the human body is included.

ESD from nylon or human hair onto polyethylene or steel can cause these types of damage to unprotected electrostatic discharge sensitive devices:

- Changes in basic characteristics
- Degradation of performance
- Catastrophic failures.

##### B. **Electrostatic Discharge Sensitive (ESDS) Devices**

Any equipment that can have damage from ESD is an ESDS device.

An LRU is a line replaceable unit that can be:

- An assembly or part that is not ESDS
- A metal encased assembly or box that contains ESDS parts and may or may not be ESDS
- A nonmetal encased assembly or box that contains ESDS part and may or may not be ESDS
- An ESDS printed wiring board assembly (PWA) or card.

ESDS LRUs:

- Have ESDS labels for identification
- Have more necessary precautions than equipment that is not ESDS.

##### C. **General Conditions for Work with ESDS Devices**

All persons who remove, install, or move ESDS devices should have knowledge of:

- How static electricity is generated
- How ESDS equipment is protected from static electricity.

##### D. **Identification of ESDS Line Replaceable Units (LRUs)**

Three types of labels are used to identify:

- Which LRUs are ESDS
- What precautions are necessary to install and remove the LRUs.

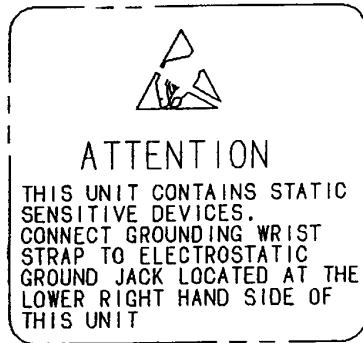
Refer to:

- Figure 1 for the three types of labels
- Figure 2 for the usual locations of the labels in the E/E bay
- Figure 3 for the usual locations of the labels in the card file.

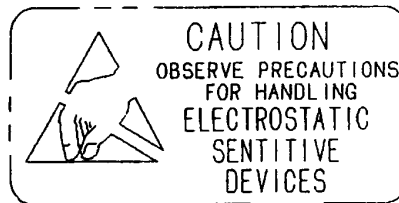
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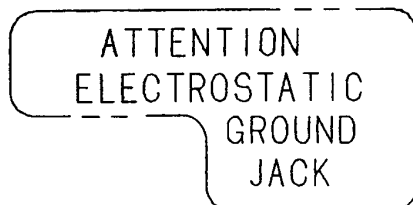
Label Type 1



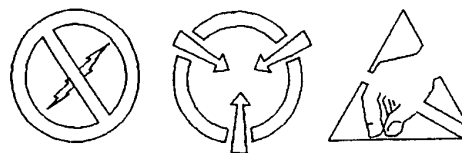
Label Type 2



Label Type 3



Label Type 4



Label Type 5

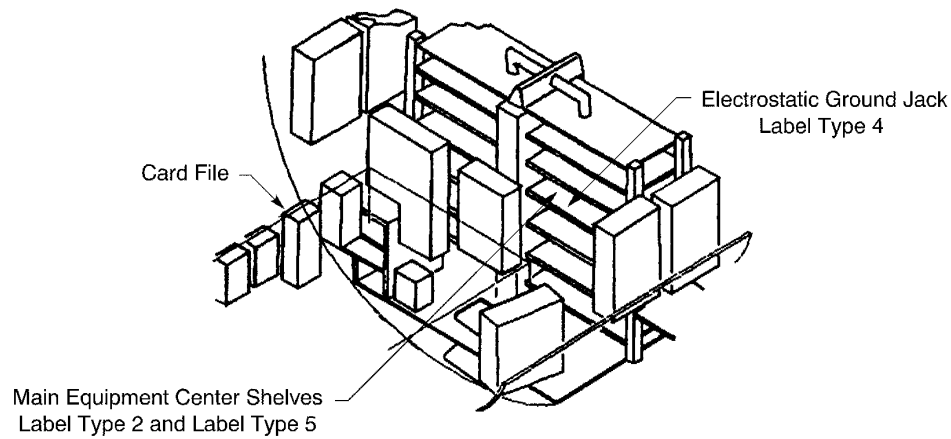
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**TYPES OF ESDS LABELS**  
**Figure 1**

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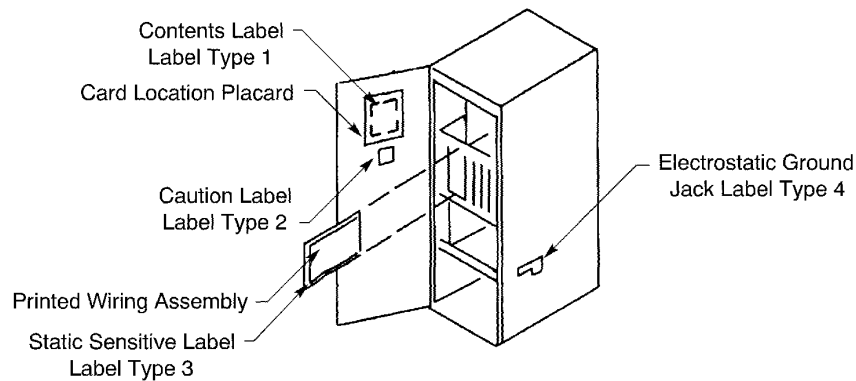
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**USUAL LOCATIONS OF ESDS LABELS IN THE E/E BAY**

**Figure 2**



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**USUAL LOCATIONS OF ESDS LABELS IN THE CARD FILE**

**Figure 3**

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**2. PART NUMBERS AND DESCRIPTIONS**

**A. Conductive Bags**

**Table 1**  
**CONDUCTIVE BAGS**

Grade	Class	Part Number	Supplier	Description
-	-	Type 2100	3M	-
-	-	Type 2110	3M	-

**B. Wrist Straps**

**Table 2**  
**WRIST STRAPS**

Part Number	Description	Supplier
2201	Wrist Band only, Gray, Small	3M
2204	Adjustable Wrist Strap	3M
2205	Fixed Metal Wrist Strap, Expandable, Small	3M
2206	Fixed Metal Wrist Strap, Expandable, Medium	3M
2207	Fixed Metal Wrist Strap, Expandable, Large	3M
2211	5 feet Coiled Cord, Gray, Small	3M
2212	5 feet Cord, Burgundy, Medium	3M
2213	5 feet Cord, Blue, Large	3M
2214	Adjustable Wrist Strap, 5 feet Coiled Cord	3M
2221	10 feet Coiled Cord, Gray, Small	3M
2224	Adjustable Wrist Strap, 10 feet Coiled Cord	3M
2244	Adjustable Wrist Strap, 5 feet Coiled Cord	3M
4001317	6 feet Coiled Cord, Large	Simco
4001374	10 feet Coiled Cord, Large	Simco
401	Wrist Strap	Charleswater Desco
407	Wrist Strap	Charleswater Desco

**NOTE:** A wrist strap that has a ground lead resistance of 250,000 ohms minimum to 1.5 megohms maximum is satisfactory.

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**C. Conductive Dust Caps**

**Table 3**  
**CONDUCTIVE DUST CAPS**

Grade	Class	Part Number	Supplier	Description
-	-	025-1155-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 1
-	-	025-1156-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 1
-	-	025-1157-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 2 and Size 3
-	-	025-1158-001	ITT Cannon	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 2 and Size 3
-	-	8660-1404	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 1
-	-	8660-1405	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 1
-	-	8660-1406	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Power, Size 2 and Size 3
-	-	8660-1407	Souriau	BACC66E, BACC66G, and BACC66J Receptacles (ARINC 600), Signal, Size 2 and Size 3
-	-	211600-1	AMP	BACC66E, BACC66G, and BACC66J Receptacles and Plugs (ARINC 600), Size 1
-	-	211600-2	AMP	BACC66E, BACC66G, and BACC66J Receptacles and Plugs (ARINC 600), Size 2 Size and 3 (Size 3 Needs Two)
-	-	NEC-()	Nicor, Inc.	Circular Connector Cap, Black, Material 75; Specify Shell Size
-	-	NEP-()	Nicor, Inc.	Circular Connector Plug, Black, Material 75; Specify Shell Size

**D. Tie Material**

**Table 4**  
**TIE MATERIAL**

Grade	Class	Part Number	Supplier	Description
-	-	-	-	Twine, 100 Percent Cotton

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**E. Wrist Strap Testers**

**Table 5**  
**WRIST STRAP TESTERS**

Grade	Class	Part Number	Supplier	Description
-	-	EN425-AC	Semtronics	-
-	-	716	3M	-
-	-	746	3M	-
-	-	Ask 1784 Model 9810	Desco	-

**3. NECESSARY TESTS**

**A. Wrist Strap Continuity Test**

This paragraph gives the procedures to test the continuity of a ESDS protective wrist strap with either of these:

- A wrist strap tester
- An ohmmeter.

**NOTE:** The continuity test with a wrist strap tester is the recommended procedure.

- (1) To do the test with a wrist strap tester:
  - (a) Make a selection of a wrist strap tester from Table 5.
  - (b) Put the wrist strap on.
  - (c) Plug the jack end of the wrist strap into the tester.
  - (d) Do the touch test.
- (2) To do the test with an ohmmeter:
  - (a) Plug the jack end of the wrist strap into the ground or common receptacle of the meter.
  - (b) Adjust the meter to the applicable resistance to range.
  - (c) Touch the red lead of the meter to the resistor portion of the wrist strap.  
The acceptable range is from 250,000 ohms to 1,500,000 ohms.
  - (d) Put the wrist strap on.
  - (e) Hold the red lead of the meter between the forefinger and the thumb.  
The acceptable range is less than 10,000,000 ohms.
- (3) Discard any wrist strap that does not operate in the acceptable range.

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#### 4. REMOVAL OF ESDS LRUS

##### A. Printed Wiring Board Removal

- (1) Make a selection of a wrist strap from Table 2.

**WARNING:** USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power to the LRU.
- (4) Make a selection of a conductive bag from Table 1.
- (5) Plug the jack end of the wrist strap to the electrostatic ground jack of the card file.
- (6) Put the wrist strap on.
- (7) Open the access door on the card file.
- (8) Find the location of the printed circuit board.

**NOTE:** The label on the card file door identifies the location of each LRU.

- (9) Hold the printed wiring board with either pair of these extractors:
  - The top and the bottom
  - The left and the right.
- (10) Pull the printed wiring board from the card file.
- (11) Put the printed wiring board in the conductive bag.
- (12) Close the bag with any of these:
  - A fold lock
  - A zip lock
  - An ESDS label
  - A tie material from Table 4.

**CAUTION:** DO NOT USE STAPLES TO CLOSE CONDUCTIVE BAGS. DAMAGE TO THE BAG WILL EXPOSE THE CONTENTS TO ESD.

- (13) Close the card file access door.
- (14) Disconnect the wrist strap from the electrostatic ground jack.
- (15) If it is necessary to move the LRU, put it into a protective container so that no damage occurs to either the conductive bag or the LRU.

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#### B. Metal Encased Assembly Removal

- (1) Make a selection of a wrist strap from Table 2.

**WARNING:** USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power to the LRU.
- (4) Make a selection of either of these:
  - A conductive bag from Table 1
  - A conductive dust cap from Table 3.

**NOTE:** The conductive dust cap from the new LRU can be used.

- (5) Connect the jack end of the wrist strap to an electrostatic ground jack on the E/E rack or to an unpainted surface of the primary structure.
- (6) Put the wrist strap on.
- (7) Remove the LRU from the rack.
- (8) Put the dust cap on the connector of the LRU.

**NOTE:** A satisfactory alternative is to put the LRU into a conductive bag.

**CAUTION:** DO NOT TO TOUCH THE ELECTRICAL PINS. DAMAGE CAN OCCUR TO THE INTERNAL ESDS COMPONENTS.

#### 5. INSTALLATION OF ESDS LRUS

##### A. Printed Wiring Board Installation

- (1) Make a selection of a wrist strap from Table 2.

**WARNING:** USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power.
- (4) Open the access door on the card file.
- (5) Find the location for the printed circuit board.

**NOTE:** The label on the card file door identifies the location of each LRU.

- (6) Remove the printed wiring board from the conductive bag.
- (7) Hold the printed wiring board with either pair of these extractors:
  - The top and the bottom

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- The left and the right.
- (8) Push the LRU into the card file.
- (9) Lock the extractors.
- (10) Close and the card file access door.  
Make sure that the access door is in position.
- (11) Disconnect the wrist strap from the electrostatic ground jack.

**B. Metal Encased Assembly Installation**

- (1) Make a selection of a wrist strap from Table 2.

**WARNING:** USE ONLY WRIST STRAPS THAT HAVE A GROUND LEAD RESISTANCE OF 250,000 OHMS MINIMUM TO 1.5 MEGOHMS MAXIMUM. CONTACT BETWEEN A LOW RESISTANCE WRIST STRAP AND A HIGH VOLTAGE IS A SHOCK HAZARD AND WILL CAUSE INJURY TO THE PERSON.

- (2) Do the wrist strap test. Refer to Paragraph 3.
- (3) Disconnect the system electrical power.
- (4) Connect the jack end of the wrist strap to an electrostatic ground jack on the E/E rack or to an unpainted surface of the primary structure.
- (5) Put the wrist strap on.
- (6) Remove the conductive dust caps from the connectors of the LRU.
- (7) Push the LRU into the rack.
- (8) Disconnect the jack end of the wrist strap from ground.

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