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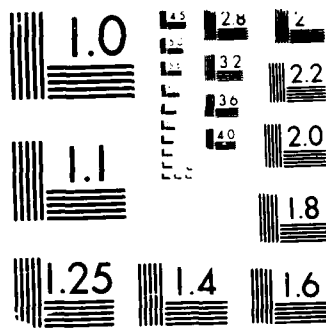
PROCEDURES FOR IDENTIFICATION AND HANDLING OF PRINTED  
CIRCUIT BOARDS (PCBS)(U) ARMY MATERIEL COMMAND  
TOBYHANNA PA PACKAGING STORAGE AND CONTAINERIZATION CEN  
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ASTM NO. 2500-108 (ANALOG)

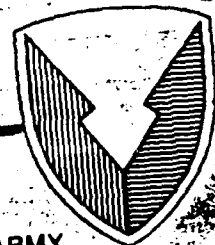
PROCEDURES <sup>for</sup> DTIC FILE COPY 2

**IDENTIFICATION and HANDLING  
of  
PRINTED CIRCUIT BOARDS (PCBs)**

AD-A191 177

Prepared by:  
PACKAGING AND STORAGE DIVISION  
U.S. ARMY MATERIEL COMMAND  
PACKAGING, STORAGE, AND CONTAINERIZATION CENTER  
TOBYHANNA, PA 18466-5097

Dec 1987



US ARMY  
MATERIEL COMMAND

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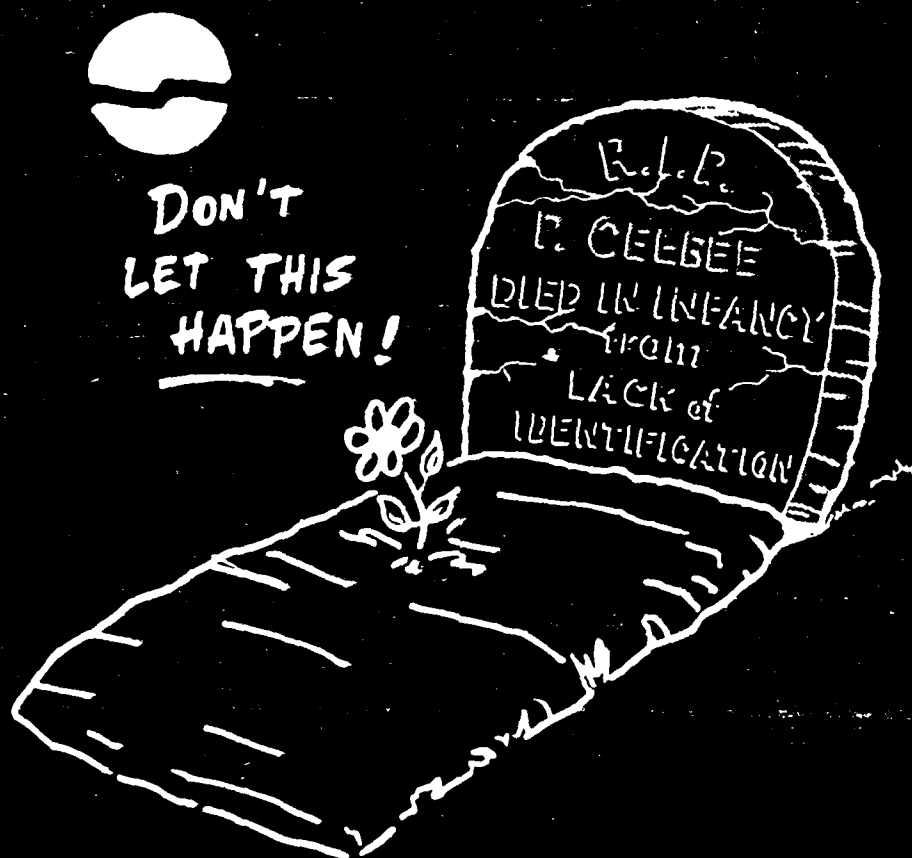
**DISTRIBUTION STATEMENT A**  
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Distribution Unlimited

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FOREWORD

This booklet is provided to furnish you, the soldier in the field, with instructions on what to do with PCBs when they are removed from the end item. It also tells you what materials and equipment you need to protect PCBs from electrostatic discharge (ESD) and electromagnetic induction (EMI) forces.



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FOR ANY QUESTIONS, COMMENTS, OR  
SUGGESTIONS REGARDING THIS BOOKLET, WRITE  
TO:

DIRECTOR  
AMC PACKAGING, STORAGE,  
AND CONTAINERIZATION CENTER  
ATTN: SDSTO-TP-P  
TOBYHANNA, PA 18466-5097

OR CALL US ON AUTOVON 795-7685.

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INSPECTED  
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## INTRODUCTION

PRESENTLY, THE ARMY IS FACED WITH TWO MAJOR PROBLEMS CONCERNING HANDLING AND IDENTIFYING PRINTED CIRCUIT BOARDS (PCBs):

1. MANY PCBs ARE DAMAGED WITHIN THE REPAIR AND SUPPLY CYCLE FROM ELECTROSTATIC DISCHARGE (ESD) OR ELECTROMAGNETIC INDUCTION (EMI).
2. PCBs ARE LOST BECAUSE SUPPLY PERSONNEL ARE UNABLE TO IDENTIFY THEM. THIS DAMAGE OR LOSS COSTS US, THE TAXPAYER, A LOT OF MONEY. IT IS ESTIMATED THAT THE AVERAGE COST OF A PCB IS IN THE NEIGHBORHOOD OF \$1,000.

NORMALLY, IT IS THE RESPONSIBILITY OF SUPPLY PERSONNEL TO PACKAGE REPAIRABLE RETURN ITEMS TO PROTECT THEM THROUGHOUT THE SUPPLY CYCLE. SOME ITEMS, HOWEVER, MUST HAVE SOME PROTECTIVE PACKAGING APPLIED BEFORE THEY CAN BE ROUTED TO THE SUPPLY UNIT. ALL ITEMS WHICH ARE SENSITIVE TO ESD MUST NOT ONLY BE PROTECTED FROM NORMAL HANDLING ENVIRONS SUCH AS CLIMATIC, SHIPPING, AND STORAGE; THEY MUST ALSO BE PROTECTED FROM ESD.

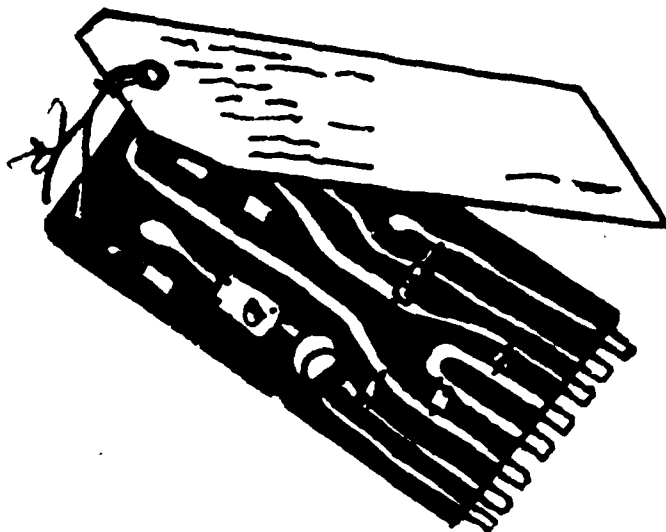
**THIS PROTECTION MUST BE APPLIED AS SOON AS THE PCB'S ARE REMOVED FROM THE END ITEM.**

RE: Distribution Statement  
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Per Mr. Crysel, AMC Packaging, Storage, and Containerization Center/SDSTO-TP-P

<input checked="" type="checkbox"/>
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<i>per</i>
<i>Telecom</i>
Codes
/or
Special

SOME PCBs ARE NOT MARKED BY A DRAWING OR PART NUMBER WHEN THEY ARE MANUFACTURED BECAUSE OF ITEM SIZE OR OTHER RESTRICTIONS. WHEN THESE ITEMS ARE RECEIVED AS REPAIRABLE RETURNS, THEY COULD BE MISIDENTIFIED AND LOST, OR PROCESSES TO IDENTIFY THEM COULD BE HAMPERED. EITHER WAY, IT COSTS EXTRA DOLLARS IN SUPPLY RESOURCES.

THIS BOOKLET PROVIDES INFORMATION ON EQUIPMENT AND MATERIALS WITH ORDERING DATA FOR PROTECTION OF PCBs. IT ALSO PROVIDES INSTRUCTIONS FOR MARKING AND IDENTIFYING THE ITEMS. THE BOOKLET IS NOT INTENDED TO PROVIDE COMPLETE PACKAGING INSTRUCTIONS. THE PACKING INSTRUCTIONS HEREIN ARE ONLY TO PROVIDE PROTECTION FOR THE ITEM WHILE BEING ROUTED TO THE SUPPLY UNIT.



# I EQUIPMENT

## FIELD SERVICE KIT

5920-01-253-5368

*if you order this.....*

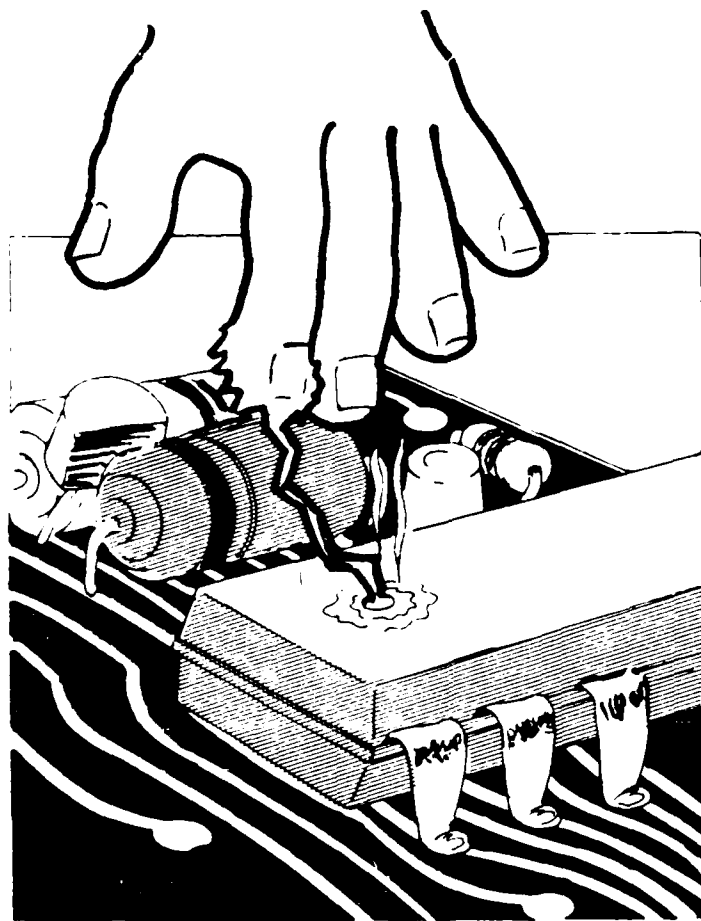


*you'll get this*

- 3 EA Pouch, MIL-P-81997, type II
- 3 EA Barrier bag, MIL-B-81705, type I
- 2 EA Wrist strap
- 1 EA Ground cord
- 1 EA Mat, static dissipating



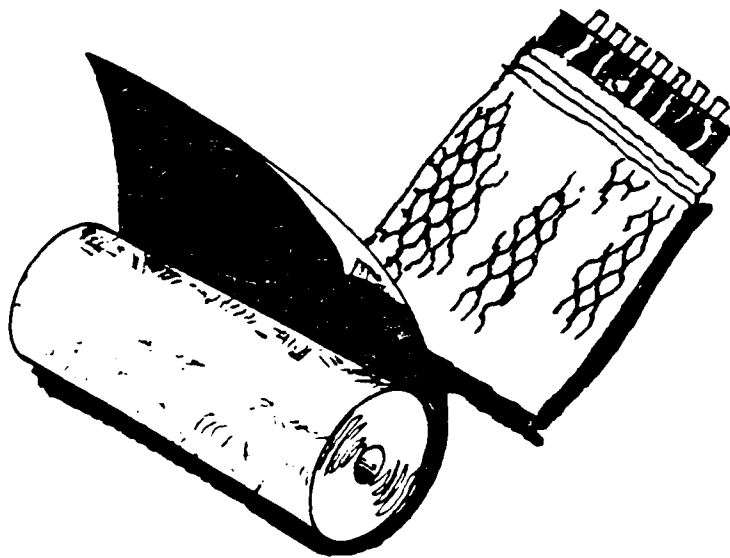
When used correctly, this kit will protect PCBs from ESD which is generated by personnel who handle them. The damage which often occurs during removal or replacement of these items is neither felt nor detected by the handling personnel. That is why it is very important to use this kit any time you are handling PCBs.



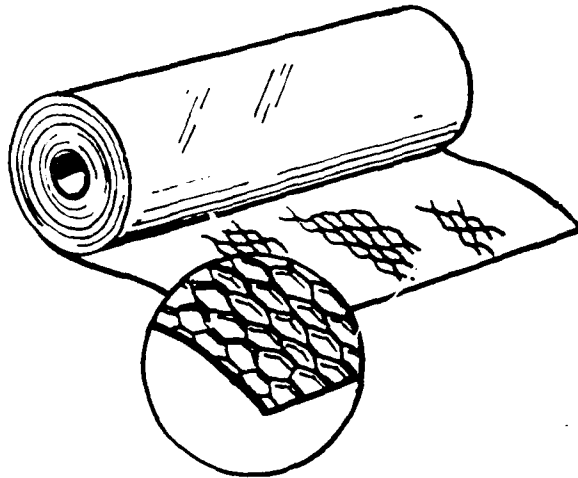
## II MATERIALS

The packaging materials listed here are designed to protect PCBs and other sensitive items from ESD/EMI damage as well as from climatic and handling environments. These materials are approved for DOD applications because they meet or exceed the referenced material specifications. They should not be substituted unless the substitute material is known to be antistatic or static dissipating.

Materials are listed according to the sequence of their application. Application instructions are contained in section III.



\*PPP-C-1842, Cushioning Material,  
Plastic, Open Cell; (Type III, Style A.)

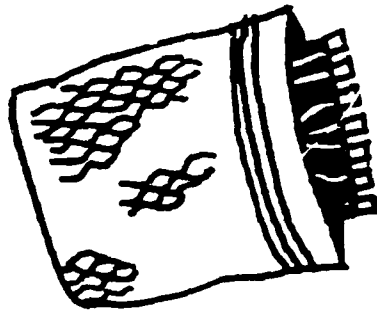


<u>NSN</u>	<u>UI</u>	<u>SIZE</u>
8135-01-057-3607	RO	1/4" X 48" X 500'

**PROTECTION AGAINST:  
ESD AND PHYSICAL DAMAGE**

\*Optional. See section III for applica-  
tion.

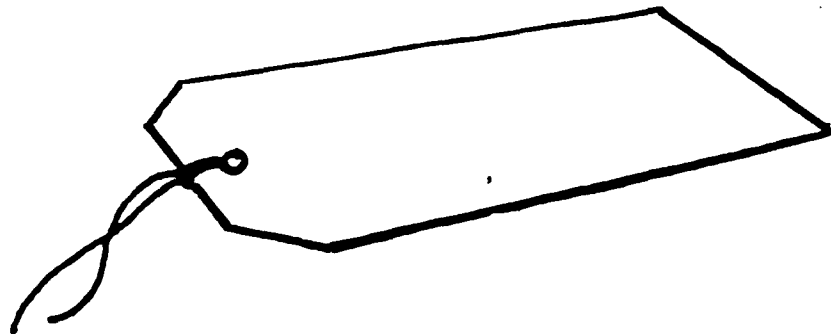
MIL-P-81997, Pouches, Cushioned,  
Flexible, Electrostatic-Free Reclosable,  
Transparent



<u>NSN</u>	<u>UI</u>	<u>SIZE</u>
8105-01-197-2965	EA	12" X 12"
8105-01-197-2966	EA	10" X 10"
8105-01-197-7846	EA	10" X 12"
8105-01-205-0207	EA	8" X 12"
8105-01-215-0462	EA	8" X 8"
8105-01-215-4752	EA	11" X 15"

**PROTECTION AGAINST:  
ESD AND PHYSICAL DAMAGE**

\*Tag, Shipping, Cotton String, White,  
Metal Eyelet, Grade 3



NSN

UI

SIZE

8135-00-292-2343

MX

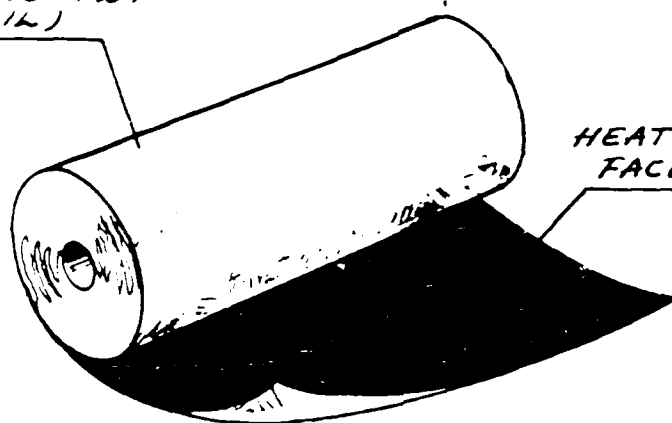
1 7/8" X 3 3/4"

**PROTECTION AGAINST:  
LOSS**

\*A suitable substitute may be used  
providing the tag is easily compatible  
with common marking devices and has a  
cotton string.

\*MIL-B-81705, Barrier Materials,  
Flexible, Electrostatic-Free, Heat  
Sealable (Type I, Opaque Foil)

BACKING PLY  
(FOIL)



HEAT SEALABLE  
FACE (OPAQUE)

NSN

8135-00-092-3220

UI

RO

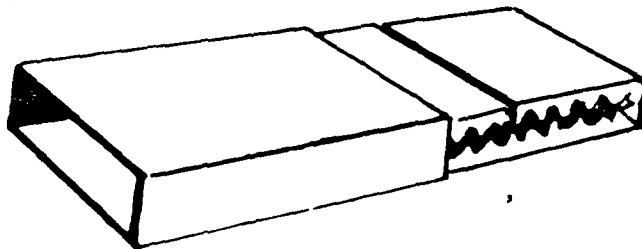
SIZE

3' X 600'

**PROTECTION AGAINST:  
EMI AND WATERVAPORS**

\*Optional. See section III for applica-  
tion.

\*PPP-B-1672, Boxes, Shipping, Reusable with Cushioning (Type II, Convolutated, Folding)



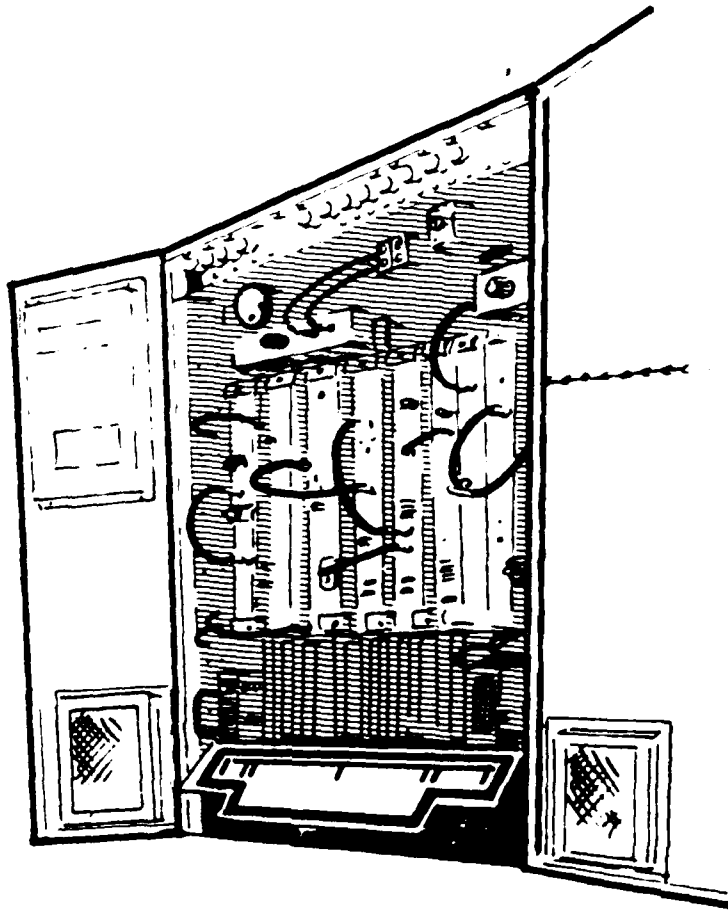
<u>NSN</u>	<u>UI</u>	<u>SIZE</u>
8115-00-101-7638	EA	9" X 6" X 3 1/2"
8115-00-101-7647	EA	9" X 6" X 2 1/2"
8115-00-787-2142	EA	6" X 5" X 2 1/2"
8115-00-787-2146	EA	12" X 8" X 2 1/2"
8115-00-787-2147	EA	6" X 5" X 3 1/2"
8115-00-787-2148	EA	12" X 8" X 3 1/2"
8115-01-019-4084	EA	18" X 12" X 3 1/2"
8115-01-019-4085	EA	18" X 12" X 2 1/2"
8115-01-057-1243	EA	13" X 13" X 3 1/2"
8115-01-057-1244	EA	10" X 10" X 3 1/2"
8115-01-057-1245	EA	16" X 16" X 3 1/2"
8115-01-093-3730	EA	24" X 16" X 3 1/2"

**PROTECTION AGAINST:  
ESD AND ROUGH HANDLING**

Antistatic boxes are identified by the word ANTISTATIC on both ends of the box, and they have pink tinted cushioning.

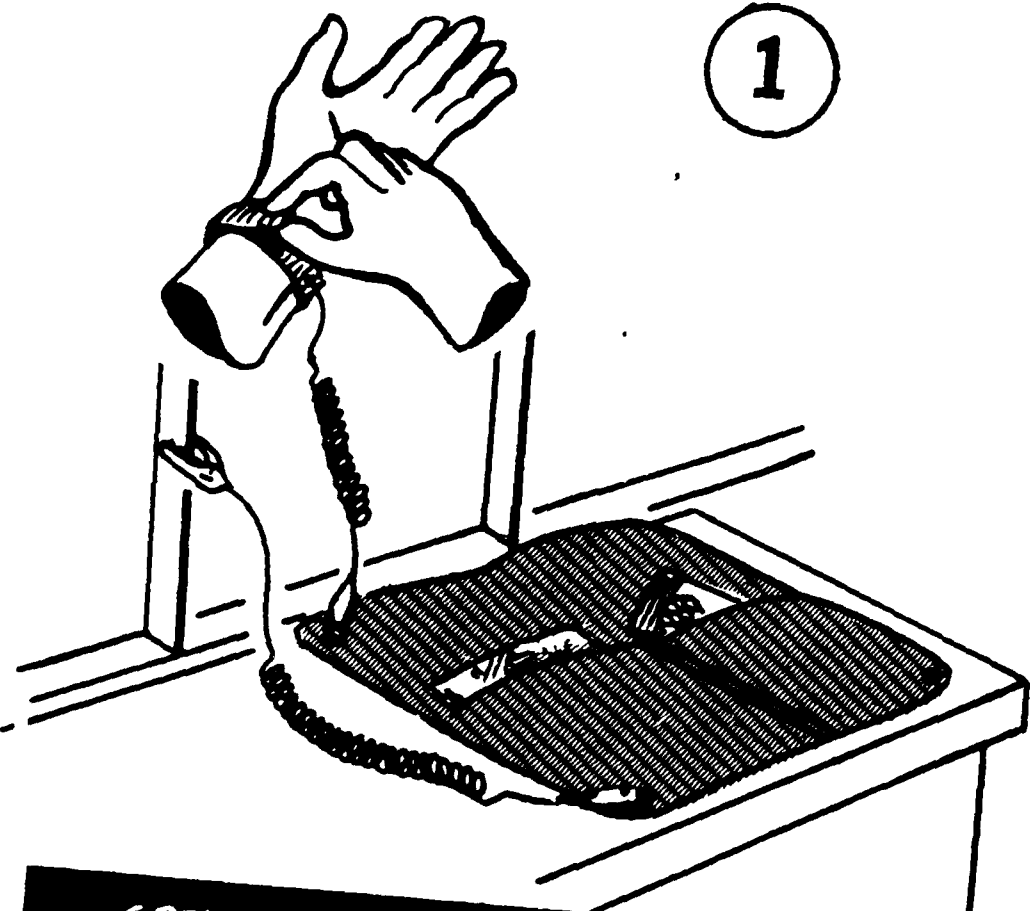
# III PROCEDURES

TO ILLUSTRATE THE FOLLOWING PROCEDURES, THE T-1054/GRC-144 RADIO TRANSMITTER IS SHOWN. THESE SAME PROCEDURES WILL APPLY TO ANY END ITEM WHICH INCORPORATES PCBs.





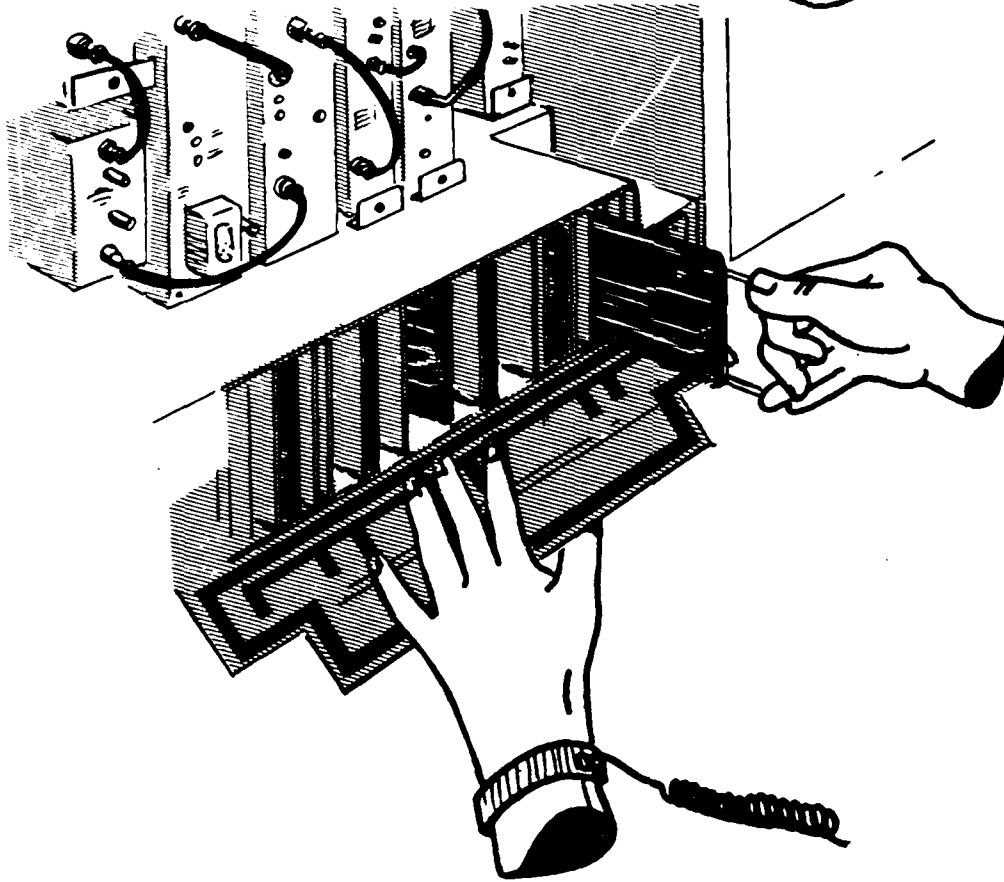
**— WARNING —**  
**TO AVOID PERSONAL INJURY, DISCONNECT**  
**ALL ELECTRICAL POWER SOURCES BEFORE**  
**PROCEEDING**



**GROUND YOURSELF TO THE FIELD**  
**SERVICE KIT AND GROUND THE**  
**KIT TO THE EQUIPMENT CHASSIS.**

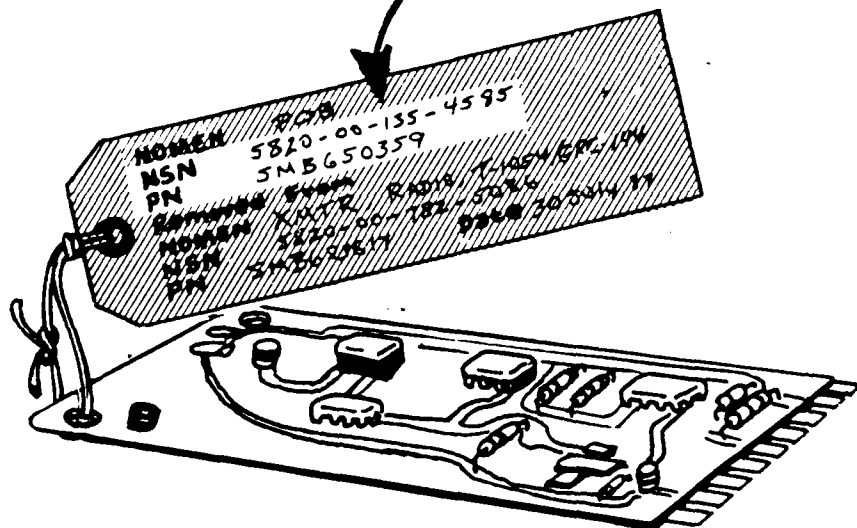
REMOVE PCB

2



3

*if known*

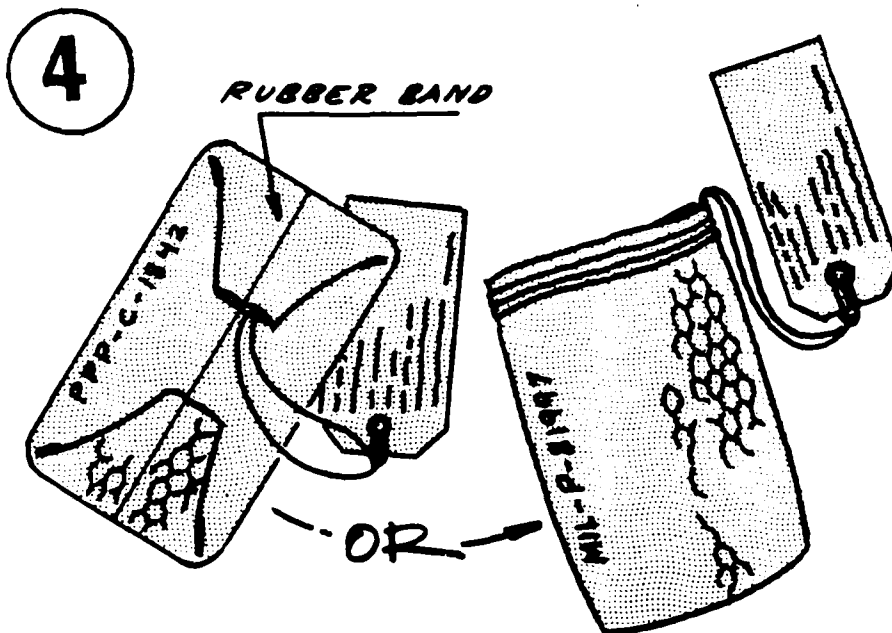


MARK AND TAG WITH THE FOLLOWING INFO:

- \* ITEM NAME
  - \* NSN
  - \* PART/DRAWING NO
  - \* REMOVED FROM:
  - \* NOMENCLATURE
  - \* NSN
  - \* PART/DRAWING NO
  - \* DATE
- } IF KNOWN

WRAP THE PCB WITH ANTISTATIC MATERIAL (PAGE 6) OR PLACE IT IN AN ANTISTATIC POUCH (PAGE 7)

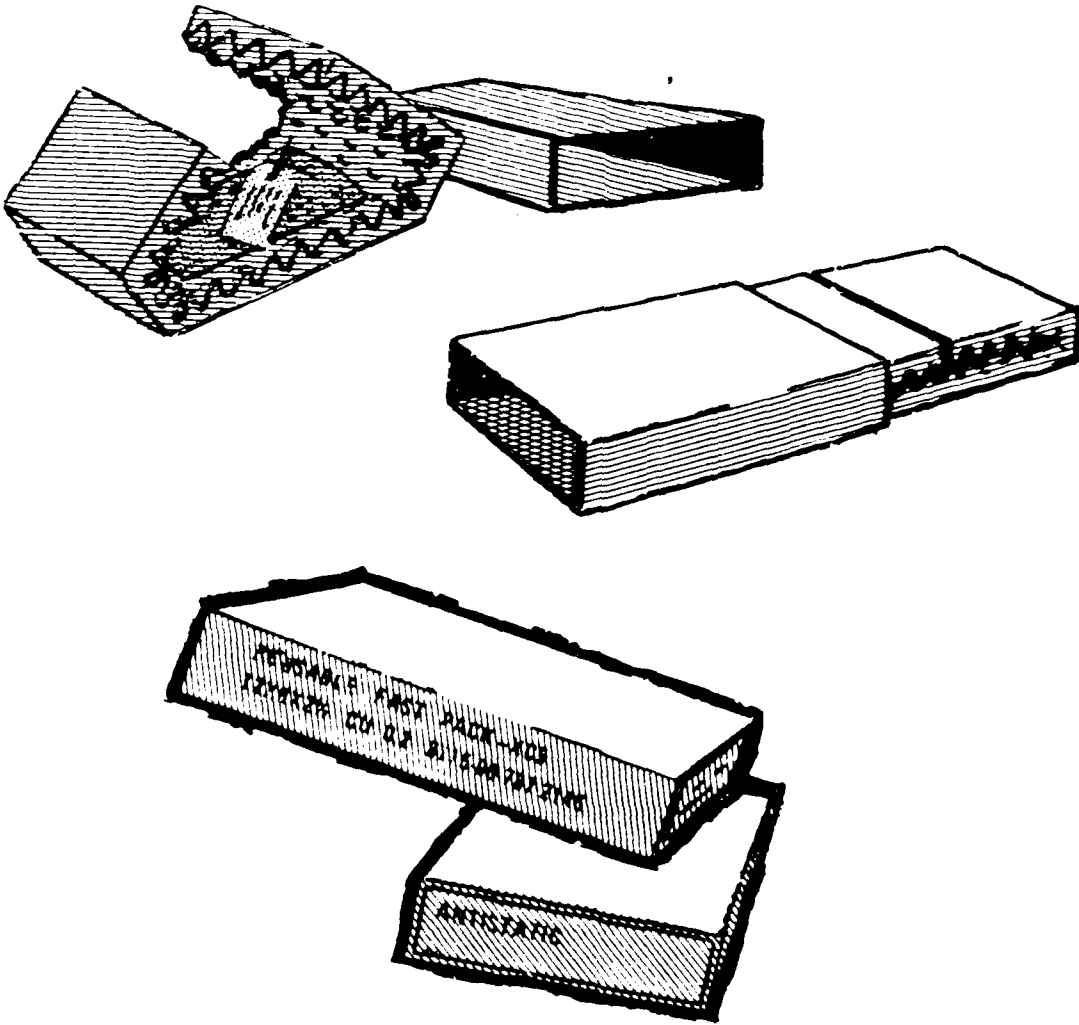
LEAVE TAG HANGING OUTSIDE OF THE POUCH OR WRAP



IF BARRIER BAGS, MADE FROM MIL-B-81705, TYPE I, ARE FURNISHED, PLACE THE WRAPPED PCB IN THE BAG (SEE PAGE 9)

**PLACE THE PCB IN AN ANTISTATIC BOX AND ROUTE TO DSU/GSU**

**5**



## SUMMARY

THE MATERIALS AND PROCESSES SHOWN IN THIS BOOKLET ARE PROVIDED TO PROTECT PCBs FROM LOSS AND DAMAGE. THE MATERIALS LISTED ARE KNOWN TO BE THE BEST MATERIALS AVAILABLE FOR PROTECTION FROM ESD. OTHER MATERIALS ARE AVAILABLE AND MAY BE USED AS LONG AS THEY QUALIFY UNDER THE APPLICABLE SPECIFICATIONS AS BEING ANTISTATIC OR STATIC DISSIPATING. THE FIELD SERVICE KIT AND ALL MATERIALS SHOWN ARE AVAILABLE THROUGH NORMAL SUPPLY CHANNELS.

END

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