

**TECHNICAL MANUAL**

**OPERATOR'S, ORGANIZATIONAL, DIRECT  
SUPPORT AND GENERAL SUPPORT  
MAINTENANCE MANUAL**

**TOPOGRAPHIC SUPPORT SYSTEM  
MOSAICKING/DRAFTING SECTION  
MODEL ADC-TSS-10  
NSN: 6675-01-106-6815**

THIS MANUAL SUPERSEDES TM 5-6675-321-14 DATED 20 JUNE 1983

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**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**28 JUNE 1985**



**CHANGE**

**NO. 4**

**HEADQUARTERS  
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WASHINGTON, D.C., 18 MAY 1992**

**Operator's Organizational, Direct  
Support and General Support  
Maintenance Manual**

**TOPOGRAPHIC SUPPORT SYSTEM  
MOSAICKING/DRAFTING SECTION  
MODEL ADC-TSS-10  
NSN: 6675-01-106-6815**

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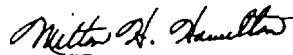
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**Operator's, Organizational, Direct  
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 Maintenance Manual**

**TOPOGRAPHIC SUPPORT SYSTEM  
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**Operator's Organizational, Direct  
Support and General Support  
Maintenance Manual**

**TOPOGRAPHIC SUPPORT SYSTEM  
MOSAICKING/DRAFTING SECTION  
MODEL ADC-TSS-10  
NSN 6675-01-106-6815**

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CHANGE }  
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HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 28 August 1986

**Operator's, Organizational, Direct  
Support and General Support  
Maintenance Manual**

**TOPOGRAPHIC SUPPORT SYSTEM  
MOSAICKING/DRAFTING SECTION  
MODEL ADC-TSS-10  
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1-13 and 1-14	1-13 and 1-14
1-51 and 1-52	1-51 and 1-52
1-57 through 1-60	1-57 through 1-60
1-67 and 1-68	1-67 and 1-68
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1-93 and 1-94	1-93 and 1-94
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2-29 and 2-30	2-29 and 2-30
3-19 and 3-20	3-19 and 3-20
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B-5 through B-9/B-10	B-5 through B-9/B-10
C-1 through C-18	C-1 through C-15/C-16
D-1/D-2	D-1/D-2
E-1 through E-6	E-1 through E-6

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**WARNING**

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HIGH VOLTAGE is used in this equipment. DEATH ON CONTACT or severe injury may result if personnel fail to observe safety precautions.

Do not be misled by the term LOW VOLTAGE. Low voltage can cause serious injury or death.

Test procedures requiring the operator or maintenance personnel to investigate equipment or restore casualties with interlocks disconnected or covers removed may result in DEATH ON CONTACT if personnel fail to observe safety precautions.

Voltages in switches and circuit breaker panels may result in DEATH ON CONTACT if personnel fail to observe safety precautions.

Failure to ground the section or equipment may result in DEATH ON CONTACT if personnel fail to observe safety procedures.

For Artificial Respiration refer to FM 21-11.

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**WARNING**

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Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent-impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

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**WARNING**

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Rotating and spinning equipment may snag loose clothing, hair or jewelry resulting in SEVERE PERSONNEL INJURY.

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**WARNING**

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Attempting to move overweight or top heavy equipment that is unsecured may result in SEVERE PERSONNEL INJURY. Always have sufficient personnel and equipment to accomplish the task.



**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND  
GENERAL SUPPORT MAINTENANCE MANUAL**

**TOPOGRAPHIC SUPPORT SYSTEM  
MOSAICKING/DRAFTING SECTION  
MODEL ADC-TSS-10, NSN: 6675-01-106-6815**

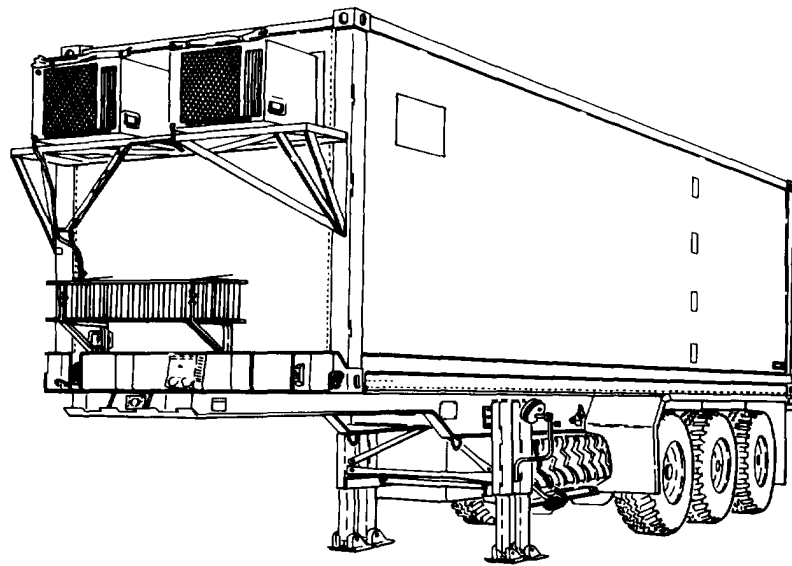
**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MPS, 4300 Goodfellow Blvd, St Louis, MO 63120-1798. A reply will be furnished to you.

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## CHAPTER 1

## MOSAICKING/DRAFTING SECTION

## Section I INTRODUCTION

## 1-1. GENERAL INFORMATION.

1-1.1 Scope. This manual contains operating and maintenance instructions for the ADC-TSS-10, Mosaicking/Drafting Section, Topographic Support System (TSS). The purpose of the Mosaicking/Drafting Section is to prepare controlled and uncontrolled photomosaics. The trailer chassis is covered in TM 5-2330-305-14, Operator, Organizational, Direct Support and General Support Maintenance Manual, Topographic Support System, Chassis, Semitrailer, ISO Container Transporter. Repair parts and special tools are listed in TM 5-6675-321-24P, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List, Mosaicking and Drafting Section, Topographic Support System. Lubrication instructions are contained in LO 5-6675-321-12, Lubrication Order, Mosaicking/Drafting Section, Topographic Support System. All authorized equipment, supplies, and their locations for transport are shown in Location and Description of Major Components of this manual.

1-1.2 Purpose of Equipment. To provide a transportable facility for preparation of controlled and uncontrolled photomosaics for photomaps.

1-1.3 Maintenance Forms and Records. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, the Army Maintenance Management System (TAMMS).

1-1.4 Reporting Equipment Improvements (EIR's). If the Mosaicking/Drafting Section needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: U.S. Army Troop Support Command, ATTN: AMSTR-QX, 4300 Goodfellow Blvd, St Louis, MO 63120-1798. We will send you a reply.

1-1.5 Destruction of Material to Prevent Enemy Use. For information on destruction of material to prevent enemy use, refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

1-1.6 Preparation for Storage or Shipment.

- a. Perform your preparation for movement procedures.
- b. For administrative storage of equipment, refer to TM 740-90-1.
- c. The chapters of this manual describe special shipping instructions for major components located in the section.
- d. In the event this equipment must be removed from the section for repair or replacement, contact your battalion for packing and shipping instructions.

**1-2. EQUIPMENT DESCRIPTION.**

1-2.1 Equipment Characteristics, Capabilities, and Features.

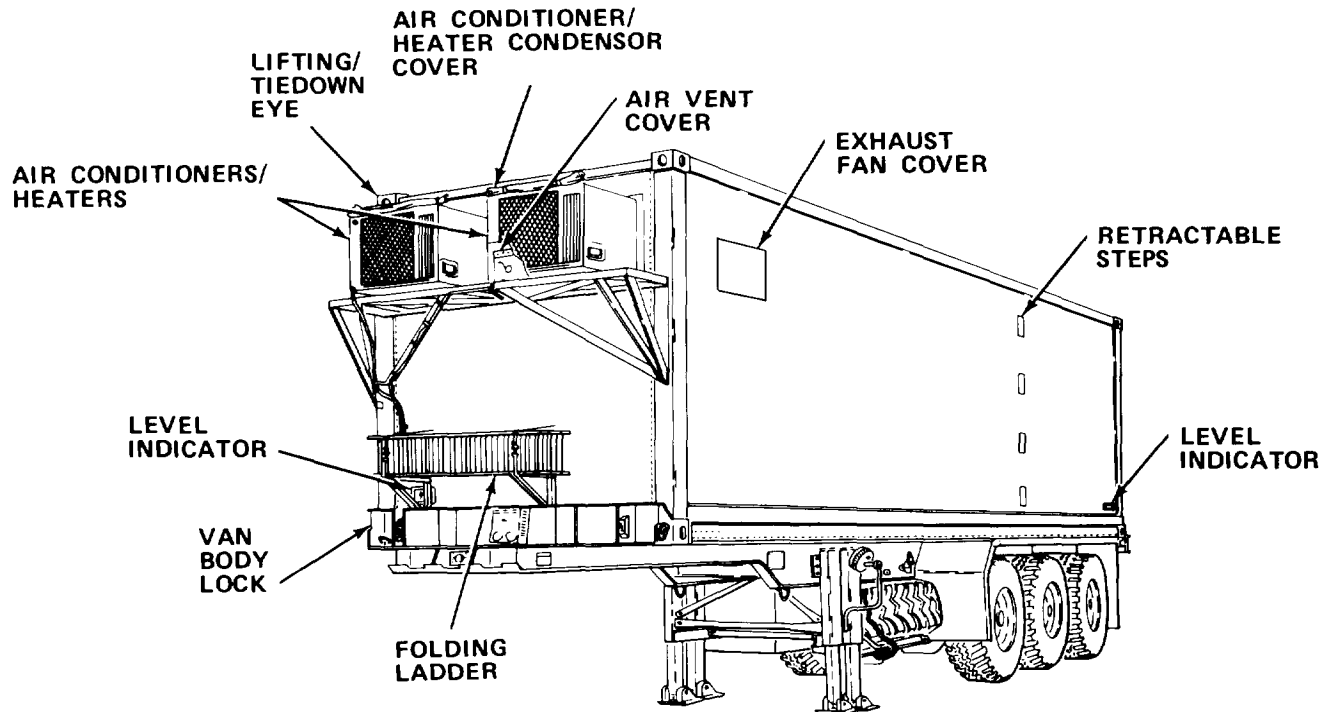
- a. Air and sea transportable.
- b. Transportable cross-country capability when mounted on trailer chassis.
- c. Controlled internal environment.

1-2.2 Special Considerations.

- a. Site must permit section to be leveled within  $\pm 2^\circ$ , be well drained, and provide adequate overhead concealment. Wooded areas and other obstacles must not impede movement of transporters.
- b. Dispersal of topographic sections is limited to the length of electric power transmission cable available for unit generators.
- c. During site selection, avoid overhead power transmission lines to prevent danger from electric shock or electromagnetic interference.
- d. Power is normally supplied by 60 kW generators. Commercial electric power should be used if it is compatible and available.
- e. Cross-country capability of sections and transporters is limited. Relocation should be accomplished over hard-surfaced, all-weather roads whenever possible.

1-2.3 Location and Description of Major Components.

## a. Roadside exterior.



**VAN BODY LOCK.** Locks van body to trailer chassis.

**AIR CONDITIONERS/HEATERS.** Two air conditioner/heater units for internal environmental control.

**LIFTING/TIEDOWN EYES.** Attachment point for lifting or tying down van body.

**AIR CONDITIONER/HEATER CONDENSER COVERS.** Covers air conditioner/heater condenser to prevent water/air entering air conditioner/heater unit when in transport or storage.

**AIR VENT COVER.** Covers air vent opening.

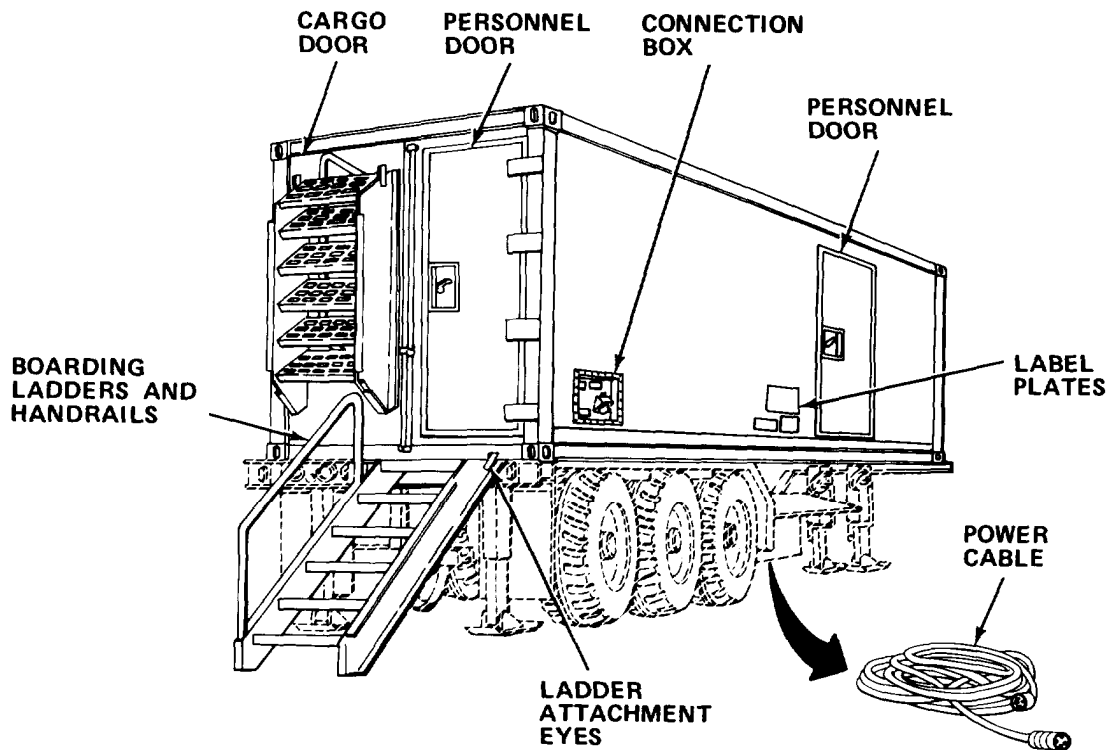
**EXHAUST FAN COVER.** Covers exhaust fan opening.

**RETRACTABLE STEPS.** Provide access to roof.

**LEVEL INDICATORS.** Indicate van body inclination.

**FOLDING LADDER.** Allows access to air conditioners and top of van.

b. Curbside Exterior.



**CARGO DOOR.** Access for equipment removal/installation.

**PERSONNEL DOORS.** Doors are 35.75 in. (90.8 cm) wide by 86 in. (218.4 cm) high.

**PERSONNEL DOORWAYS.** Doorways are 30.75 in. (78.1 cm) wide by 78.5 in. (199.4 cm) high.

**LABEL PLATES.** Provide weight/moment data.

**POWER CABLE.** Power cable is in 50 ft (15.2 m) sections. (Stored in trailer chassis storage box.)

**CONNECTION BOX.** Contains terminals for ground cable, power cables, and telephone lines.

**LADDER ATTACHMENT EYES.** Attachment points for boarding ladders.

**BOARDING LADDERS AND HANDRAILS.** Provide access to section.

## c. Interior.

PERSONNEL DOOR. Weatherproof fitted with blackout switch.

BLACKOUT SWITCH. Turns ceiling lights off when activated.

FIRE EXTINGUISHER. Dry chemical fire extinguisher.

CARGO DOOR. Access for equipment installation/removal.

FIRST AID KIT. Limited first aid supplies.

WALL STORAGE CABINET: Storage.

MAGNIFIER LAMP. Provides illumination and magnification for light table work station.

FLUORESCENT CEILING LAMP. White, two-level (high/low) overhead light.

BLACKOUT DOME LIGHT. Red-lensed, white-lensed 12 V ac light actuated when blackout switch operates, or from external power.

EXHAUST FAN. Provides ventilation. Fitted with lightproof louvers and weatherproof cover.

AIR CONDITIONERS/HEATERS. Internal environmental control.

FOLDING CHAIRS. Additional seating.

EMERGENCY LIGHTS. Battery-powered lighting actuated by power failure.

AIR VENT. Permits filtered make-up air to enter section.

PAPER TRIMMER. Trims sheet paper.

FILING CABINET. Storage.

HAND SAW. Used to cut building board in mosaic construction.

BLACKOUT CURTAIN. Lightproof cover for personnel door.

CIRCUIT BREAKER PANEL. Circuit breakers with phase test indicator.

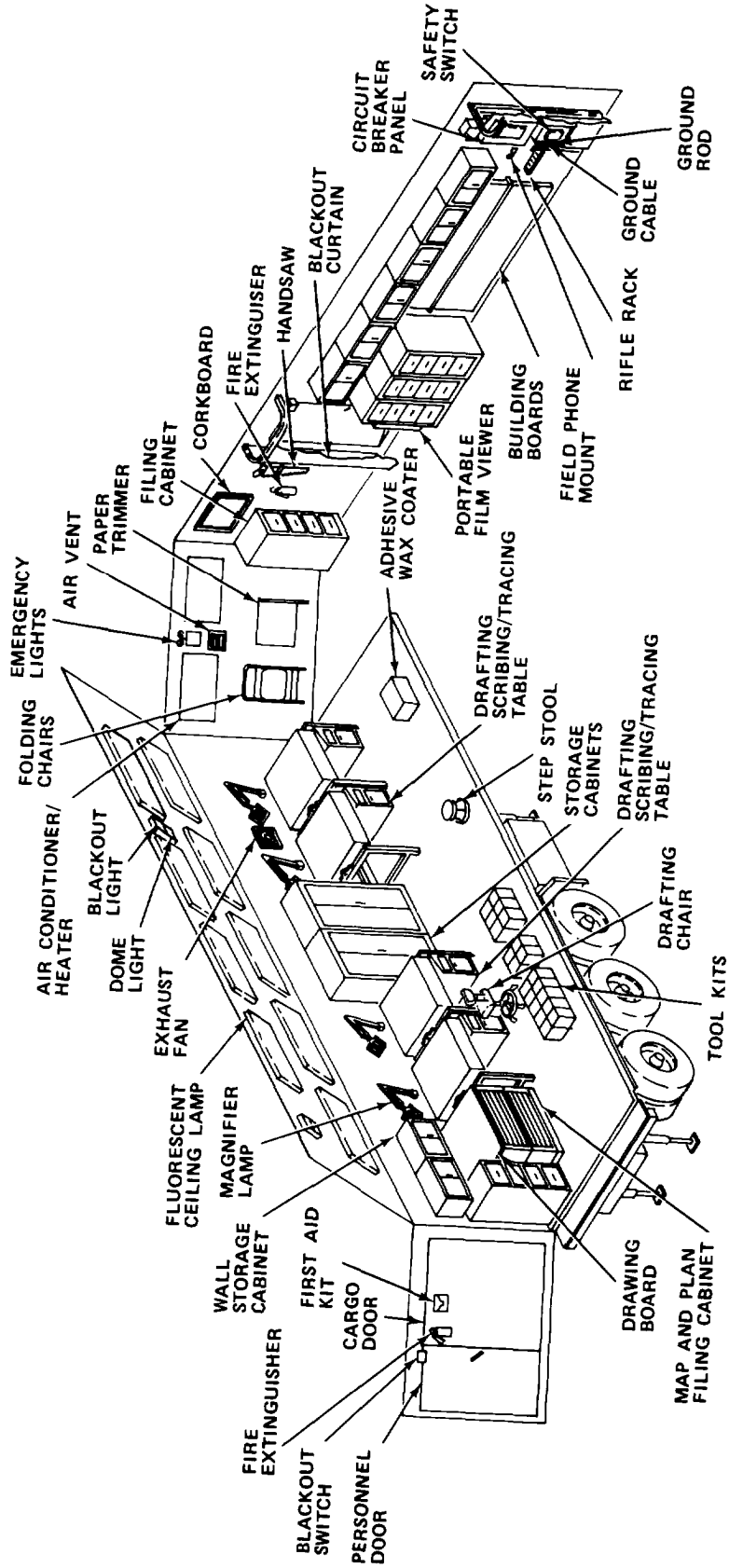
SAFETY SWITCH. Main power safety disconnect switch.

GROUND ROD. Electrical ground for section.

GROUND CABLE. Used with ground rod.

RIFLE RACK. Weapon storage.

FIELD PHONE MOUNT. Mounting box for field phone.



BUILDING BOARDS. Bulk material, 4 ft x 8 ft x 1/4 in. (1.02 m x 2.03 m x 6.4 mm), to build mosaics.

PORTABLE FILM VIEWER. Used to view aerial film.

ADHESIVE WAX COATER. Waxer to affix mosaic segments to building boards.

DRAFTING, SCRIBING/TRACING TABLE. Illuminated tracing board. Turns over for drafting board.

STEP STOOL. Provides access to high storage cabinets.

SUPPLY CABINETS. Storage.

TIEDOWNS. Stored inside storage cabinet when not in use.

DRAFTING, SCRIBING/TRACING TABLE. Illuminated tracing board. Turns over for drafting board.

DRAFTING CHAIR. Adjustable height chair.

TOOL KITS.

DRAWING BOARD. Work surface when using portable film viewer.

MAP AND PLAN FILING CABINET. Storage for maps/topographic products.

1-2.4 Equipment Data - ISO Container (Unmounted).

Dimensions

Length	33.66 ft (10.26m)
Width	8ft (2.44 m)
Height	8ft (2.44 m)
Cubage	2038 ft <sup>3</sup> (57.7 m <sup>3</sup> )

Connections

Telephones	One telephone (three-post) connection
Power	13.5 kW. One 120/208 V ac, three-phase, four-wire connection and one 12 V dc connection
Ground	Ground lug

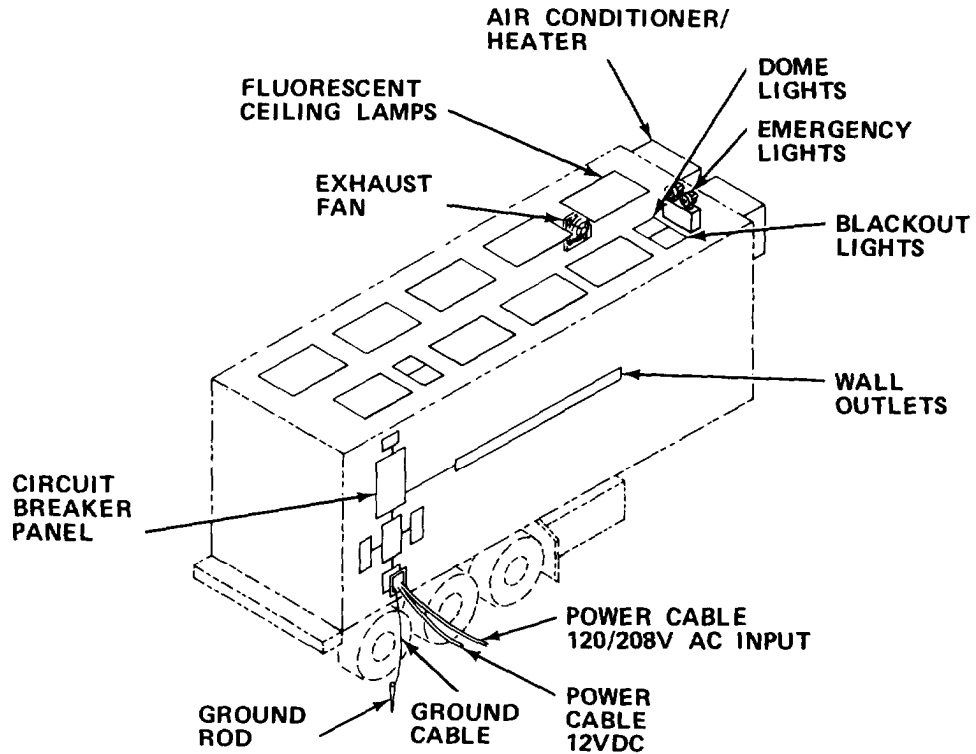
Air Conditioner/Heater (Two Units)

Cooling	18,000 Btu/hr (5274 W) each
Heating	14,300 Btu/hr (4190 W) (Max) each
Power Requirements	208 V, 60 Hz, three-phase
Exhaust Fan	289 ft <sup>3</sup> /min (8.18m <sup>3</sup> /min)
Air Vent	289 ft <sup>3</sup> /min (8.18 m <sup>3</sup> /min)
Weight	
Gross (Container and Chassis)	24,910 lbs (11,296.69 kg)
Tare (Container Only)	13,470 lbs (6108.65 kg)

1-3. TECHNICAL PRINCIPLES OF OPERATION.

1-3.1 General. The operation of major components located within the section are explained in the appropriate chapter for that equipment.

1-3.2 Electrical System.





GROUND ROD. Used to ground section.

GROUND CABLE. Used with ground rod.

CIRCUIT BREAKER PANEL. Contains voltage indicator, phase monitor, and circuit breakers.

WALL OUTLETS. Provide grounded outlets for portable or plug-in equipment.

DOME LIGHTS. White-lensed, 12 V dc lights powered from external source. Separately switched and fused.

EXHAUST FAN. Plug-in fan. Separately fused.

FLUORESCENT CEILING LAMPS. Two-level (high/low) overhead lights with blackout override switches.

EMERGENCY LIGHTS. Battery powered. Activated by power loss.

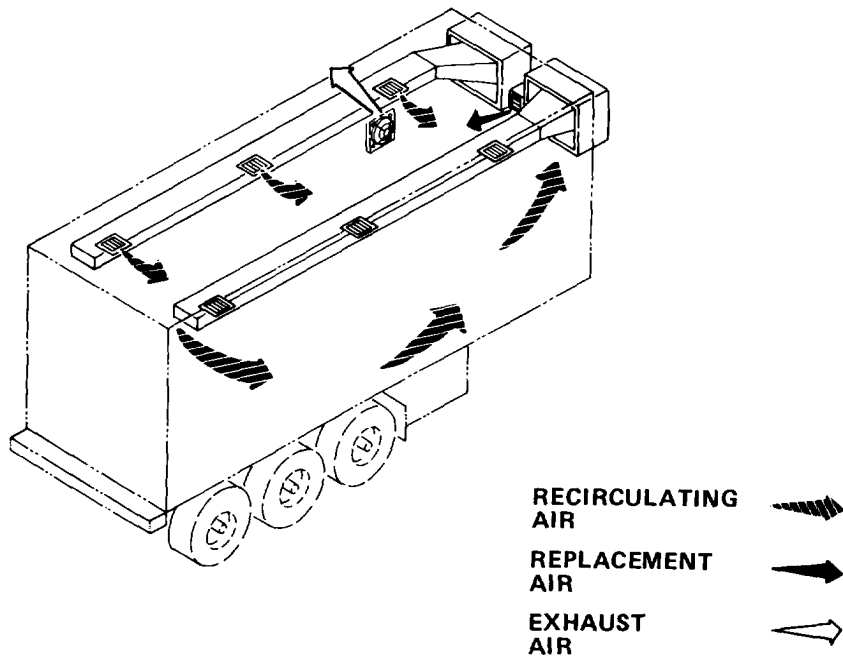
AIR CONDITIONER/HEATER. Air conditioner and electrical heater powered by three-phase, 208 V, 30 amp current.

BLACKOUT LIGHTS. Red-lensed, 12 V ac lights actuated when blackout switch operates.

POWER CABLES. Power input (120/208 V ac and 12 V dc).

1-3.3 Wiring Diagram. A foldout wiring diagram is provided at the end of this manual.

1-3.4 Ventilation System.



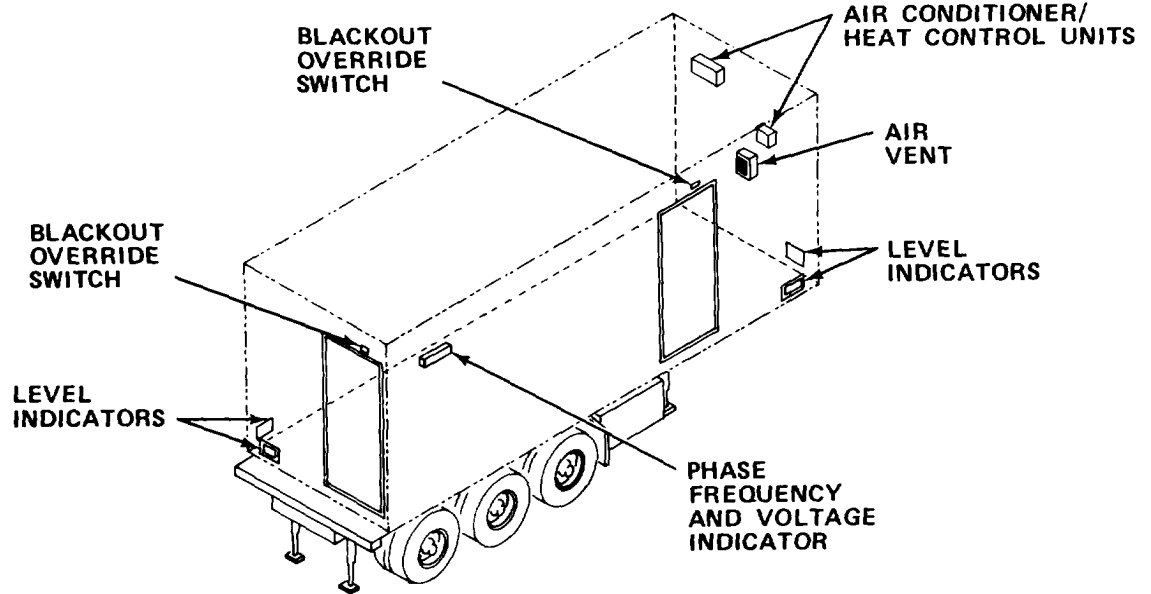
Exhaust fan exhausts air. Replacement air flows into the section through the air vent filter. Recirculating air is filtered as it enters the air conditioners/heaters. From the air conditioners/heaters, it flows through the ceiling vents and into the section.

**NOTE**

Detailed description of air conditioner/heater operation is contained in TM 5-4120-367-14, Operator, Organizational, Direct Support, and General Support Maintenance Manual, Air Conditioner, Horizontal, Compact, 18,000 Btu/hr Cooling, and TM 5-4120-367-24P, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair) for Air Conditioner, Horizontal, Compact, 18,000 Btu/hr (5274W).

Section II OPERATING INSTRUCTIONS

1-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Control or Indicator	Function
Blackout Override Switches	Turns off illumination when door is opened.
Air Vent	Permits make-up air to enter as required.
Air Conditioner/Heater Control Unit	Permits selection of air conditioner or heater mode of operation and temperature.
Phase, Frequency, and Voltage Indicator	Monitors electrical power, phase, frequency, and voltage.
Level Indicators	Used to level van body.

## 1-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

### 1-5.1 PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.
- g. Interval columns. This column determines the time period designated to perform your PMCS.
- h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.
- i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Wire Brush	1 ea
6 in. Adjustable Wrench	1 ea
Flat Tip Screwdriver	1 ea
Vacuum Cleaner	1 ea
Cheesecloth (Item 5, Appendix E)	a r
General Purpose Detergent (Item 7, Appendix E)	a r
Paint (Items 12, 12A and 12B Appendix E)	a r
Paint Brushes	a r

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

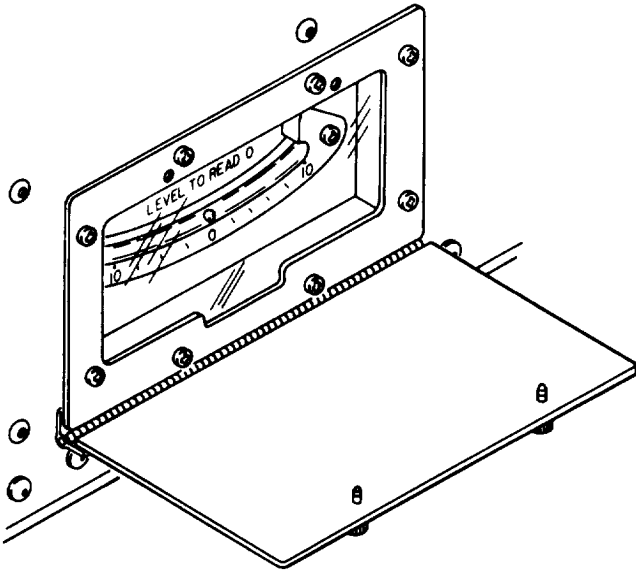
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B/W	<p><u>VAN BODY</u></p> <p><u>Inspect Exterior.</u></p> <p>1. Inspect surfaces for punctures, cracks, or open seams that could permit moisture to enter wall.</p>  <p>2. Inspect four level indicators for damage and to check that section is level.</p>	<p>Punctures, cracks, or open seams are present.</p> <p>Indicators are broken.</p>

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Exterior - Cont</u></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>To prevent death or serious injury, do not handle or clean power cable or connectors when cable is connected to power source.</p> <p>3. Inspect power cable assembly for dirt or damaged connectors.</p> <p>a. Wipe cable insulation with clean, dry cloth to remove dirt.</p> <p>b. Clean corrosion from terminals.</p> <div style="text-align: center;"> </div>	Connector damaged.

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

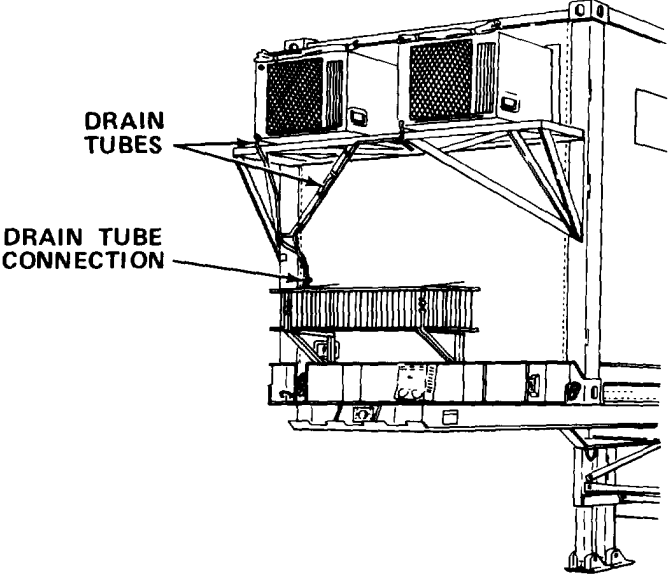
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1		<u>VAN BODY - Cont</u>	
		<u>Inspect Exterior - Cont</u>	
	B/W	4. Inspect power entry panel for accumulated dirt, water, or corrosion.  Clean power entry panel.	
B/W	5. Inspect power entry panel to be sure any unused receptacles are covered.	Missing covers.	
			
B/W	6. Inspect air conditioner/heater drain tube to be sure tube is positioned as shown. Check for breaks and crimps in hose and check connections for damage or leakage.		



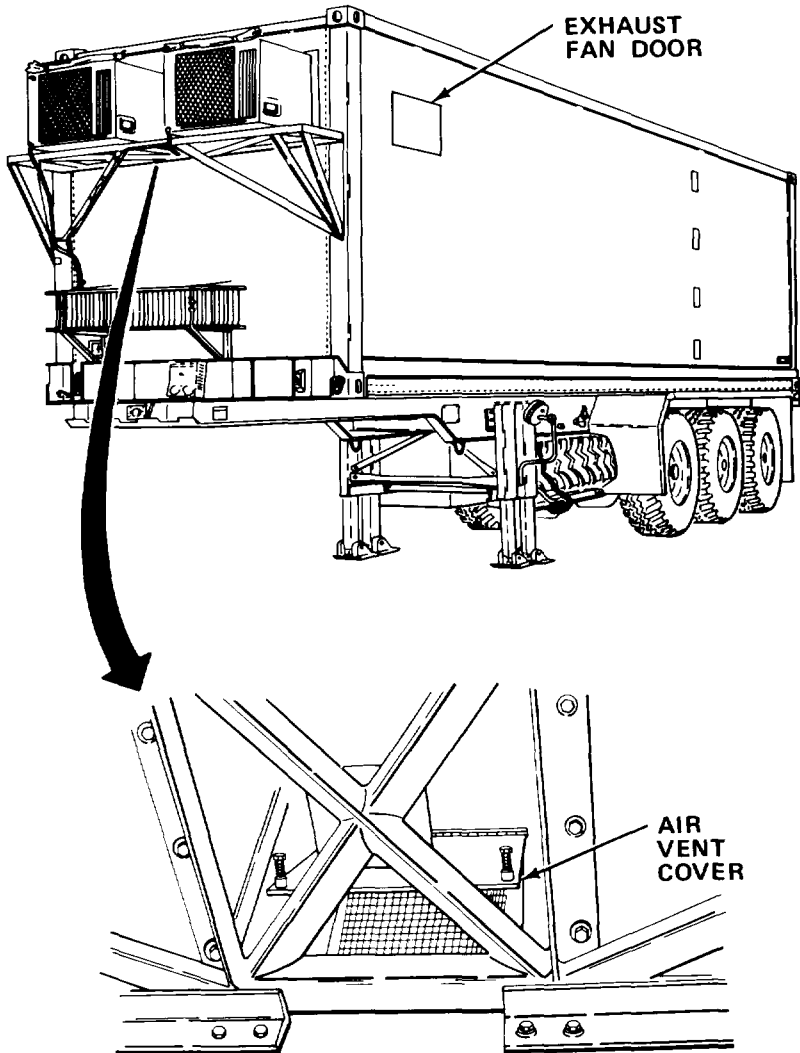
Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1		<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Exterior - Cont</u></p>  <p>EXHAUST FAN DOOR</p> <p>AIR VENT COVER</p> <p>7. Inspect exhaust fan door and air vent covers to be sure they are not blocked or clogged. Clean as required. Clean screen with vacuum cleaner as necessary.</p>	

B/W

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B/W	<u>VAN BODY - Cont</u>	Ground connections are broken or missing
		<u>Inspect Exterior - Cont</u>	
		<p>8. Visually inspect ground connections to be sure ground cable is connected to terminal lug and ground rod. If necessary, clean:</p> <p style="text-align: center;"><u><b>WARNING</b></u></p> <p>Electrical shock hazard. Power cable must be deenergized before servicing entry panel connections. Death can result from failure to observe these safety precautions.</p> <p>a. Turn power off to cable. Disconnect from power source.</p> <p>b. Disconnect ground lug from ground rod.</p> <p>c. Clean lug, cable end, and rod with wire brush.</p> <p>d. Reconnect ground cable lug to rod.</p> <p>e. Disconnect ground cable end from entry panel.</p> <p>f. Clean terminal and cable end with wire brush.</p> <p>g. Reconnect ground cable to entry panel.</p> <p>h. Reconnect cable to power source. Turn power on.</p>	
B	<p>9. Inspect boarding ladders for:</p> <p>a. Secure attachment of handrails.</p> <p>b. Steps not broken.</p> <p>c. Locking pins in place.</p>	Steps are broken or will not lock in place.	
B/D/A	<p>10. Inspect front and rear van body locks to be sure locks are fully engaged.</p>	Lock disengaged.	

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready} Available If:
<b><u>VAN BODY - Cont</u></b>			
1		<p><u>Inspect Exterior - Cont</u></p> <p>Q 1. Inspect gaskets on personnel doors for leaks or damage.</p> <p>W 11.1 Inspect hinges for proper placement of hinge pins.</p> <p>Q 2. Clean and paint blistered, pitted, or flaking areas and bare metal spots in accordance with instructions contained in TM 43-0139, Painting Instructions for Field Use.</p>	Missing hinge pins
2		<p><u>Inspect Interior.</u></p> <p>B/D 1. Test emergency lights by pressing test button.</p> <p>W 2. Inspect power cords and cables to be sure wires are not kinked, cut, or cracked.</p> <p>W 3. Inspect plug connectors to be sure all plug connectors are tight and firmly seated. Tighten if necessary.</p> <p>O 4. Inspect for burned out light bulbs and fluorescent lamps. Replace as required.</p> <p>W 5. Inspect walls, ceilings, and floor for holes, open seams, or signs of seepage or leaks.</p> <p>D 6. Check storage cabinets for broken hinges, latches, and locks.</p> <p>B/M/A 7. Inspect fire extinguishers. Be sure security seals are not broken.</p>	<p>Emergency lights do not light.</p> <p>Wires or cables are cracked or cut.</p> <p>Leaks are present.</p> <p>Hinge, latch, or lock is broken.</p> <p>Fire extinguisher is missing or seals are broken.</p>

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

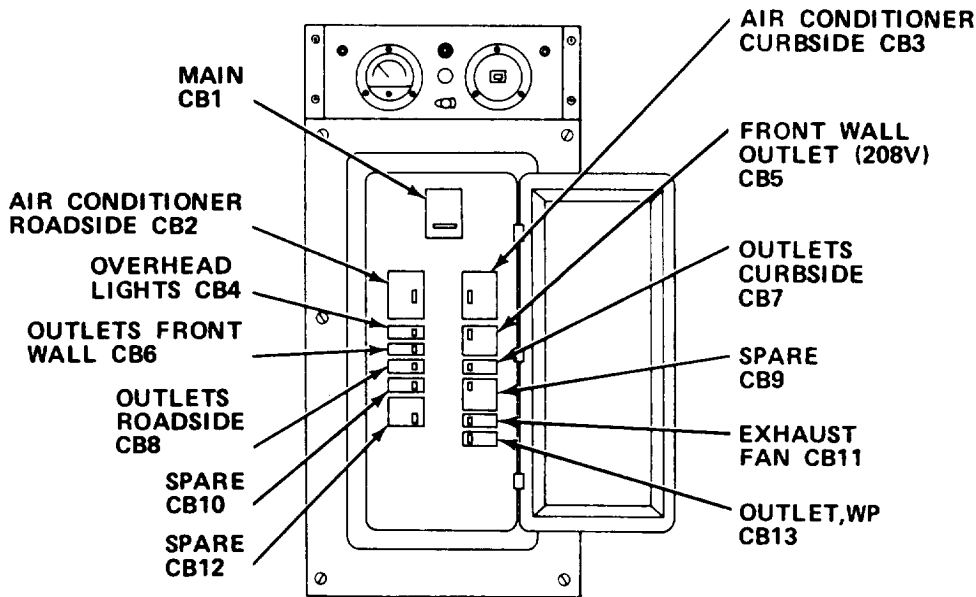
B - Before  
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ITEM NO.	INTER-VAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	Q	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Interior - Cont</u></p> <p>8. Inspect circuit breaker panel.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Inspection is to be conducted on a not-to-interfere basis with work being conducted. Individual equipment will be inspected as directed by the appropriate chapter of this manual.</p>	Circuit breaker is defective.



- a. Set main circuit breaker to ON.
- b. Set each circuit breaker to OFF, then ON.

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	Q	<u>VAN BODY - Cont</u>	
		<p><u>Inspect Interior - Cont</u></p> <p>9. Inspect light traps.</p> <p>a. Turn on fluorescent lamps (high level).</p> <p>b. Close entrance doors. Have exhaust fan and air vent open. Inspect for light leakage through vents.</p> <p>c. Place light switches ON; blackout override switches OFF.</p> <p>d. Open door and make sure internal lights go off.</p> <p>A 10. Inspect/clean interior.</p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Death or serious injury may occur if wet or damp cloth is used to wipe or clean energized equipment, power cords, or cables.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Do not sweep interior. Dislodged dirt or dust will ruin optical, electronic, and photographic equipment and supplies.</p> <p>a. Wipe vertical and horizontal painted surfaces with cleaning cloth moistened with solution of general purpose detergent and fresh water until soil is removed from painted surfaces.</p>	

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

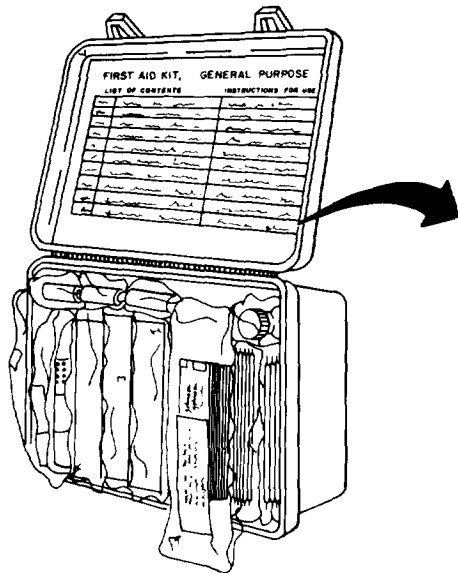
B - Before  
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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2		<u>VAN BODY - Cont</u>		
		<u>Inspect Interior - Cont</u>	<p>b. Dry vertical and horizontal painted surfaces with clean cloth.</p> <p>c. Vacuum interior of section to remove dirt and waste. Pay particular attention to work stations.</p>	
	S	11. Inspect first aid kit.		



FIRST AID KIT, GENERAL PURPOSE		
LIST OF CONTENTS	INSTRUCTIONS FOR USE	
3 ROLLS	ADHESIVE TAPE, SURGICAL, 1"X1 1/2" YARDS	USE FOR MINOR CUTS AND CLOTHING REPAIR
18 EACH	BANDAGE, ADHESIVE, 1" X2"	MINOR CUTS, AS REQUIRED
3 EACH	BANDAGE, GAUZE, COMPRESSED, CAMOUFLAGED, 3"X8" YARDS	CUT IN LENGTHS AS REQUIRED FOR BANDAGE INJURIES
1 EACH	BANDAGE, MUSLIN, COMPRESSED, CAMOUFLAGED, 3 3/4 X3 3/4 INCH	USE FOR SLING
1 PKG	BLADE, SURGICAL PREPARATION RAZOR, STRAIGHT, SINGLE EDGE, 5/8	SHAVING HAIR AND OPENING WOUNDS AS REQUIRED
1 PKG	COMPRESS AND BANDAGE, CAMOUFLAGED, 2" X2" 4x	FOR WOUNDS
3 EACH	DRESSING, FIRST AID, FIELD, 4X7 INCHES	FOR LARGE WOUNDS, EXCESSIVE BLEEDING
1 EACH	FIRST AID KIT, EYE DRESSING	FOR EYE WOUNDS, SEE INSTRUCTIONS
1 PKG	GAUZE, PETROLATUM, 2" X3 1/2" 3x	FOR BURNS, APPLY PAD OVER BURN
1 BTL	POVIDONE, IODINE SOLUTION, 1/2 OUNCE	AS DISINFECTANT AND CLEANSER OF CUTS AND WOUNDS, APPLY BEFORE BANDAGING
1 EACH	AMMONIA INHALANTS	CRUSH INHALANT BETWEEN FINGERS. HOLD A FEW INCHES FROM NOSE. HOLD CLOSER AS AMMONIA GETS WEAKER. WHEN TOO WEAK, USE FRESH INHALANT.
1 EACH	INSTRUCTION BOOKLET AND FIRST AID EXPLANATIONS	

- a. Remove first aid kit from bracket.
- b. Remove contents.
- c. Inspect container for damage.

Table 1-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	B/W	<p><u>VAN BODY - Cont</u></p> <p><u>Inspect Interior - Cont</u></p> <p>d. Inspect contents for damage. Then use checklist to inventory contents.</p> <p>e. Replace damaged or missing items.</p> <p>f. Repack kit.</p> <p>g. Reinstall kit.</p> <p>12. Inspect blackout curtains.</p> <p>a. Inspect blackout curtains and valances for tears, missing hooks, or broken eyelets.</p> <p>b. Inspect nylon hook and pile tape on curtain and wall for security of attachment.</p>	<p>Curtains damaged.</p>
3	B	<p><u>Inspect Air Conditioner/Heater.</u> Refer to TM 5-4120-367-14 for preventive maintenance checks and services.</p>	
4	M	<p><u>Service Power Cable.</u></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Electrical shock hazard. Power cable must be de-energized before servicing. Death or serious injury may occur from failure to observe this safety precaution.</p> <ol style="list-style-type: none"> <li>1. Turn off safety switch.</li> <li>2. Disconnect cable from power entry panel.</li> <li>3. Wrap any cuts or abrasions in cable with electrical insulation tape.</li> <li>4. Reconnect power cable to entry panel.</li> </ol>	

**1-6. OPERATION UNDER USUAL CONDITIONS.** Operation of the Mosaicking/Drafting Section consists of activation of power after the section has been located at the operation site and 12 V dc power disconnected.

1-6.1 Preparation for Use.

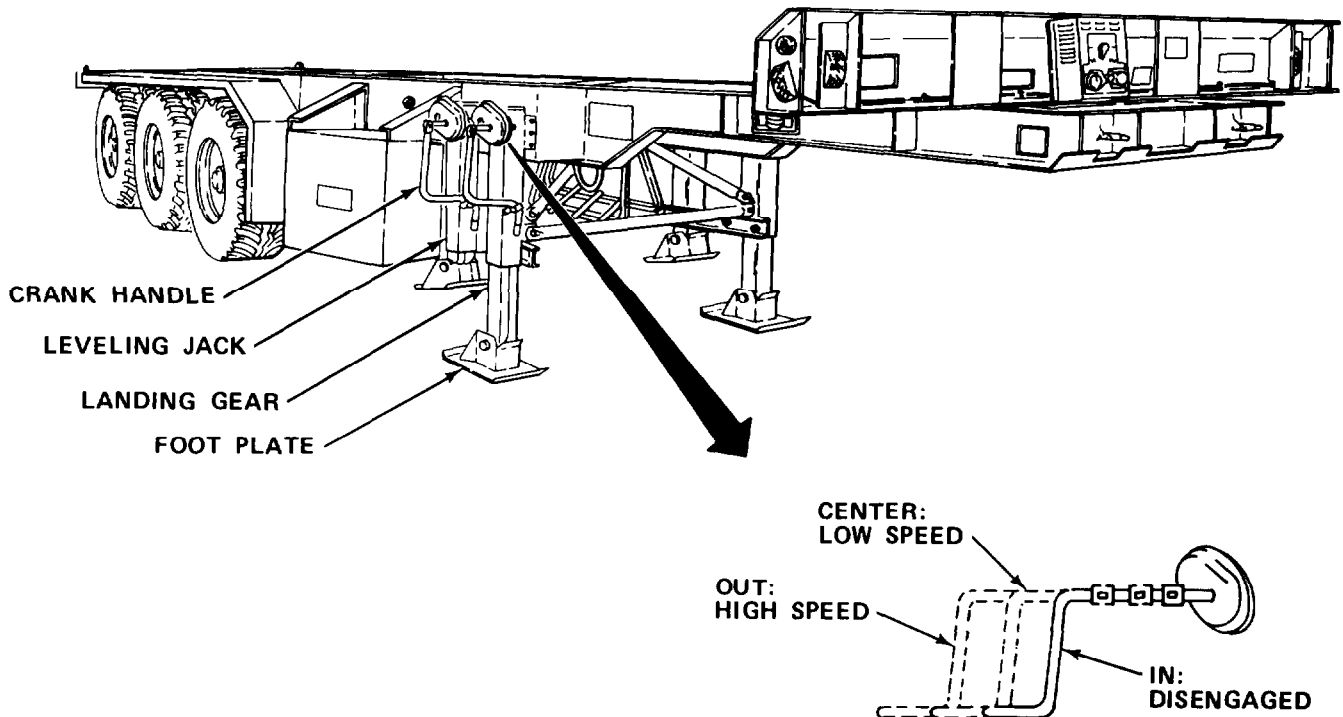
- a. Procedures for leveling.

**CAUTION**

Trailer-mounted section must be on surface that is approximately level to avoid unnecessary stress or twisting of chassis when section is leveled.

**NOTE**

- Snow or ice should be removed from under leveling foot plate before attempting to level section.
- Sand, soft ground, or mud requires that shoring or scrap material be placed under leveling foot plate to increase surface area and prevent sinking into surface.
- Be sure that air suspension is deflated as indicated in TM 5-2330-305-14.



- (1) Deflate air suspension in accordance with TM 5-2330-305-14.

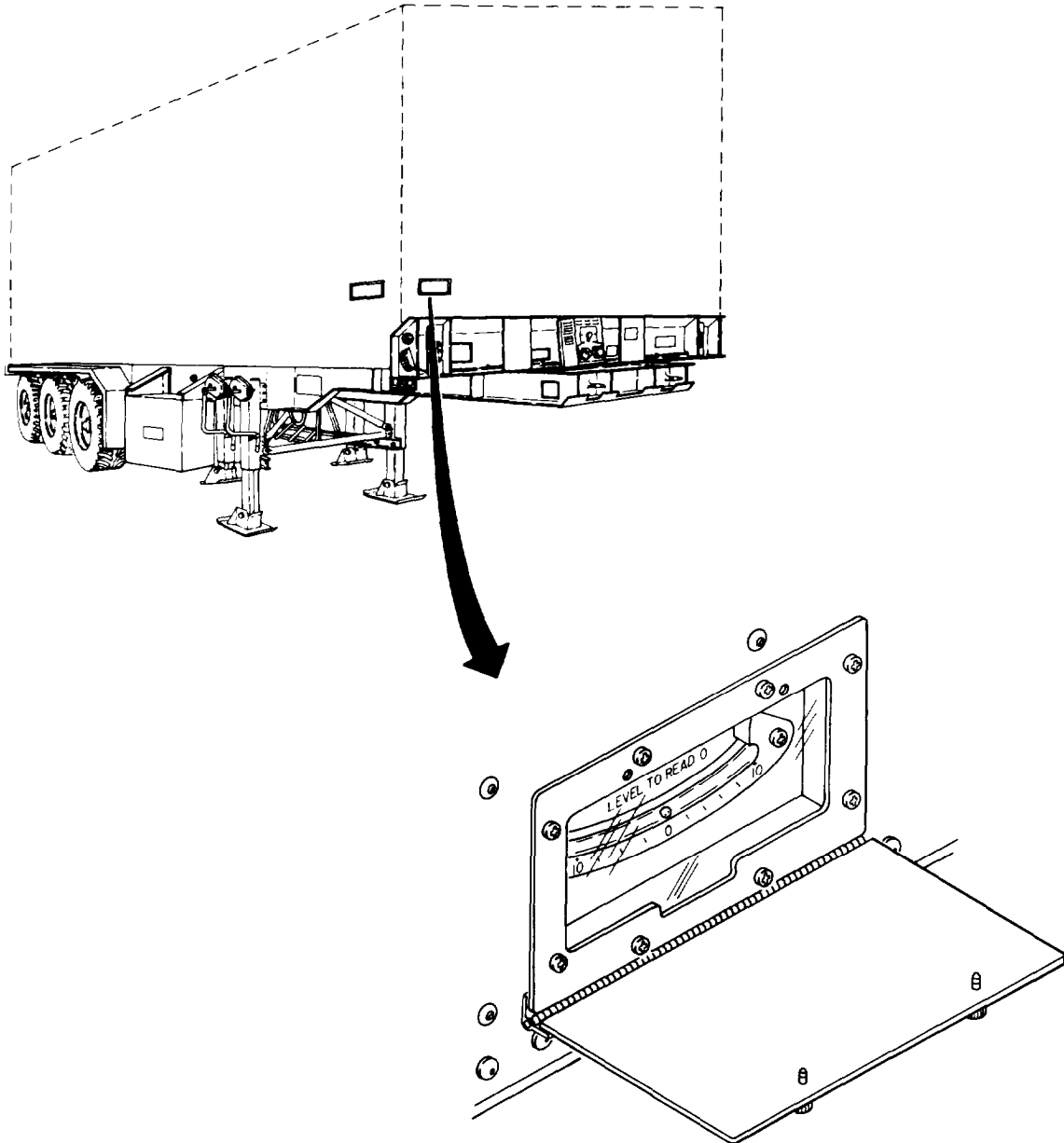


(2) Approximately level trailer chassis by raising or lowering landing gear.

(3) Move handle from secured location and swing out.

(4) Pull crank handle on each leveling jack all the way out and engage. There are two positions when handle is engaged. Fully out is high speed. Partially out is low speed.

(5) Lower each leveling jack by turning crank to right at high speed until foot plate just contacts ground.

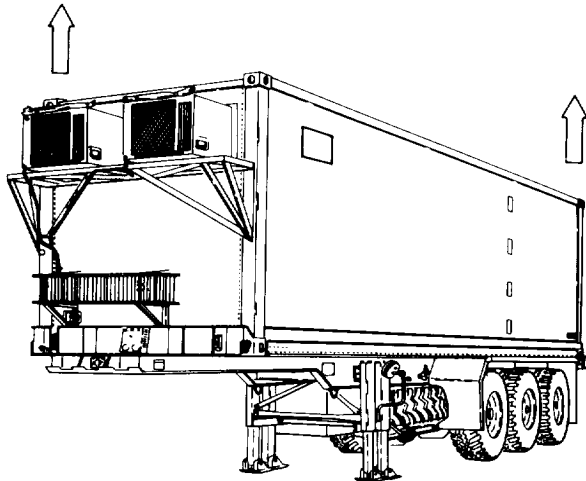


(6) Station personnel to have a clear view of level indicators at both front and rear of section.

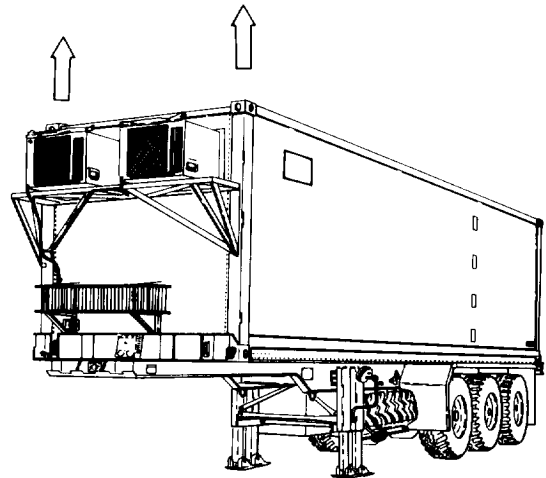
(7) Observe level indicators to determine which end and side must be raised.

**CAUTION**

Do not attempt to level section by lifting at diagonal corners, or frame will be twisted.

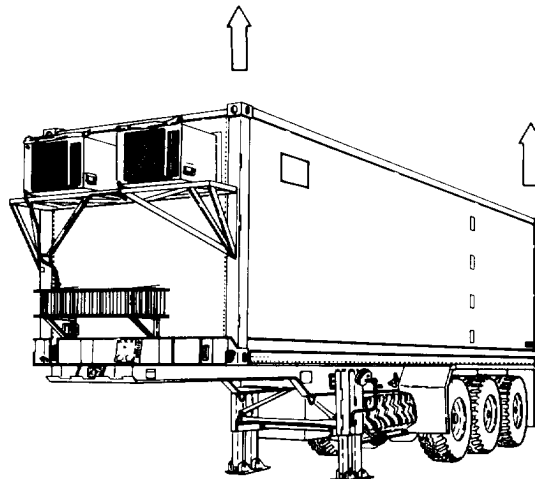


**NO**

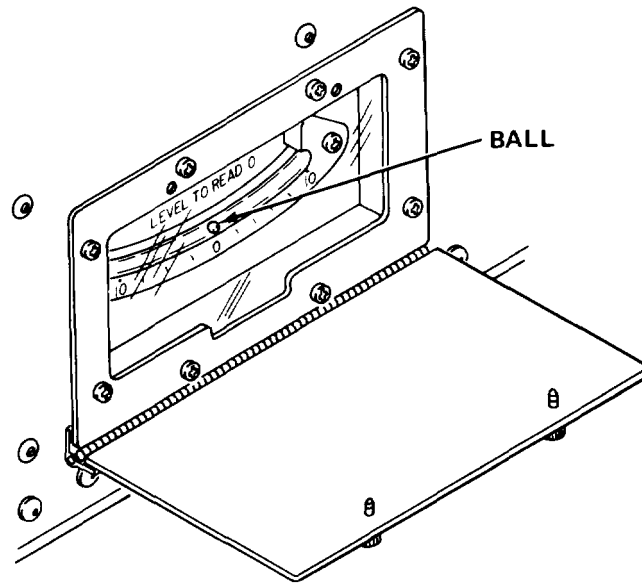


**YES**

(8) Raise low end by extending both leveling jacks at low end. Use low speed.



(9) Raise low side by extending both leveling jacks at low side.

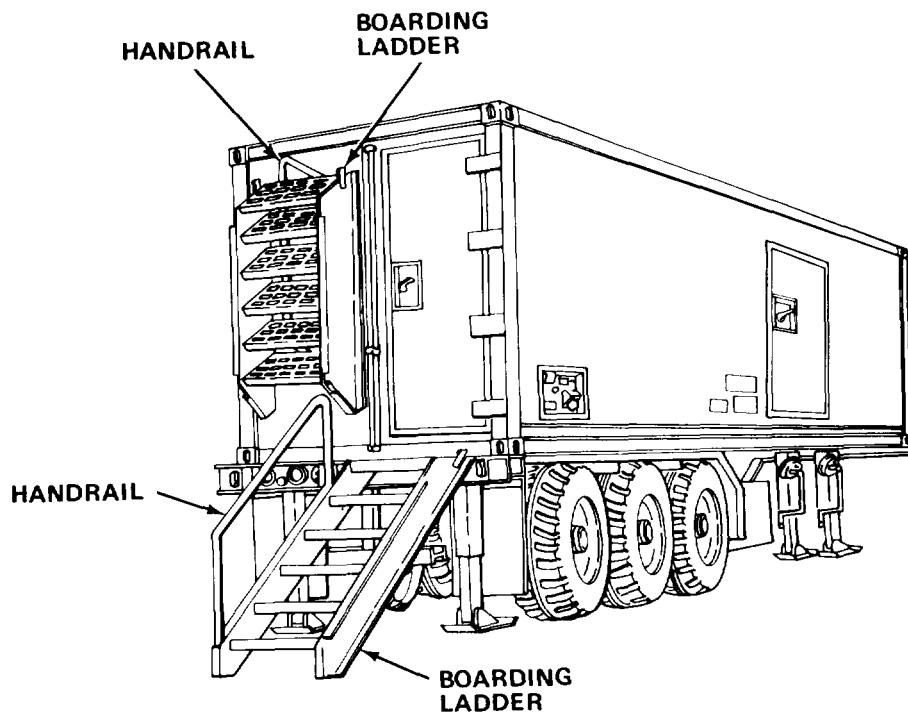


**NOTE**

Be sure ball is centered on all four level indicators  $\pm 2^\circ$ .

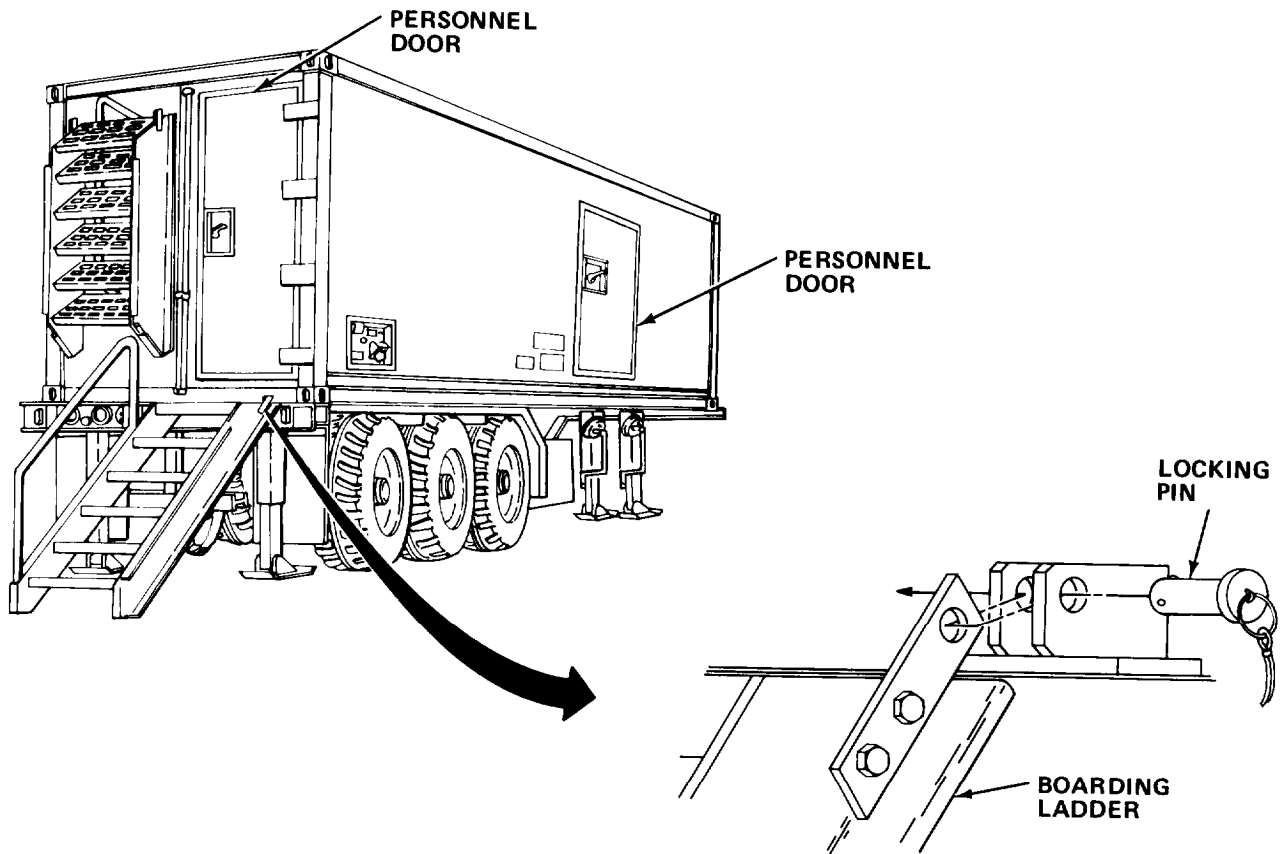
(10) Pull leveling crank handles away from trailer chassis, and lower crank handle to stowed position.

b. Procedures to activate section.

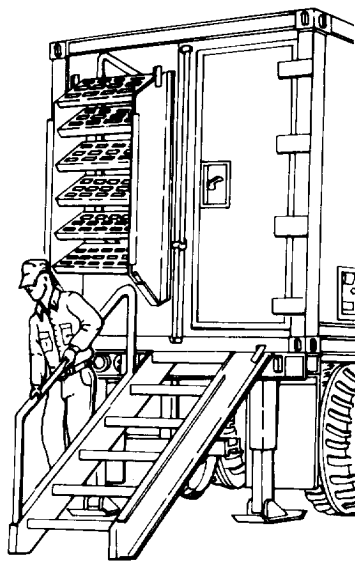


(1) Remove boarding ladders and handrails from rear of section.

(2) Remove handrails from ladders.



(3) Mount ladders at personnel doors and secure with locking pins.

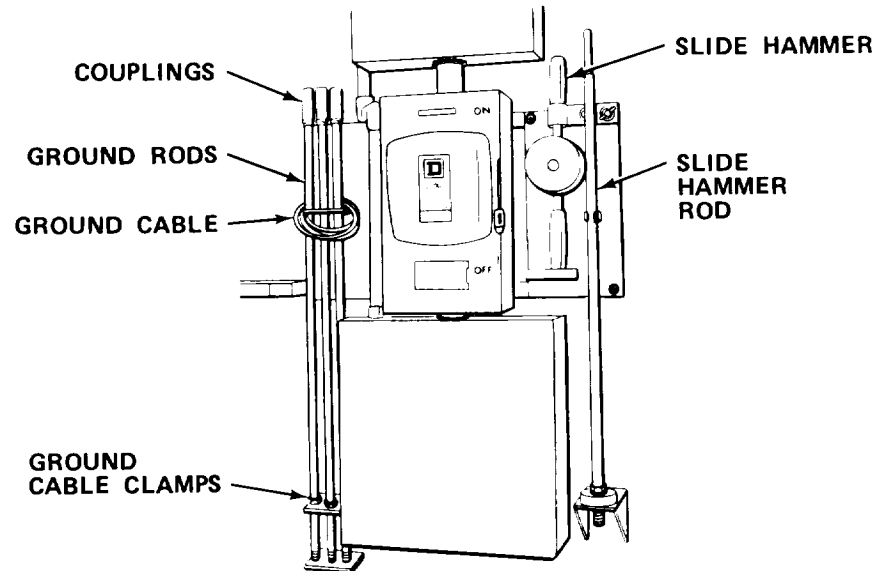


(4) Mount one handrail on each ladder.

(5) Enter section and be sure safety switch, main circuit breaker, and all equipment power supply switches are off.

**WARNING**

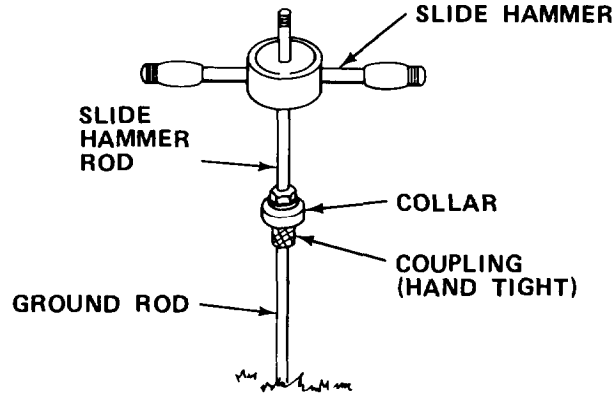
Death or serious injury may occur from connecting power cable to section before grounding.



(6) Remove ground rod, slide hammer, and ground cable from section.

**NOTE**

- Apply a thin film of grease to threaded ends of rods before driving into ground. This will permit easy disassembly upon removal from ground.
- Bottom ground rod must be numbered or identified so that it will always be the first rod driven into the ground.
- These instructions supplement TC 11-6, Grounding Techniques.



(7) Select an area as close to power entry panel as possible to install ground rod. Then assemble the first ground rod and coupling to the slide hammer rod.

**CAUTION**

Do not allow ground rod to rotate when removing the slide hammer rod. Rods must be kept screwed together to make a good electrical ground.

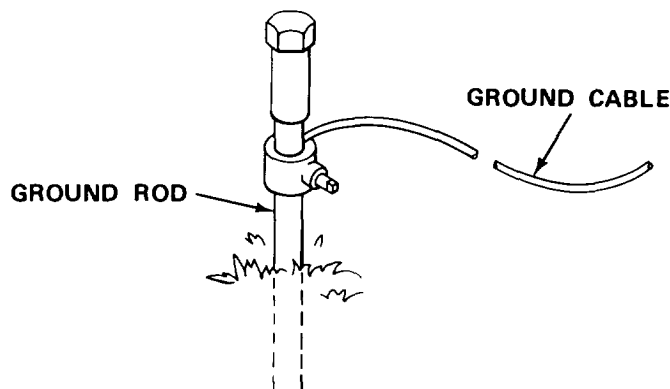
**NOTE**

Before driving ground rod be certain that rods meet inside coupling. Be sure collar is handtight against coupling.

(8) Place slide hammer on hammer rod end, and drive ground rod into ground. Remove slide hammer rod. Attach slide hammer rod to a new section of ground rod, and repeat procedure until only 12 in. (30.5 cm) of the third rod is above ground.

(9) Remove slide hammer and hammer rod, and place in section.

(10) Secure ground cable clamp and ground cable to ground rod.

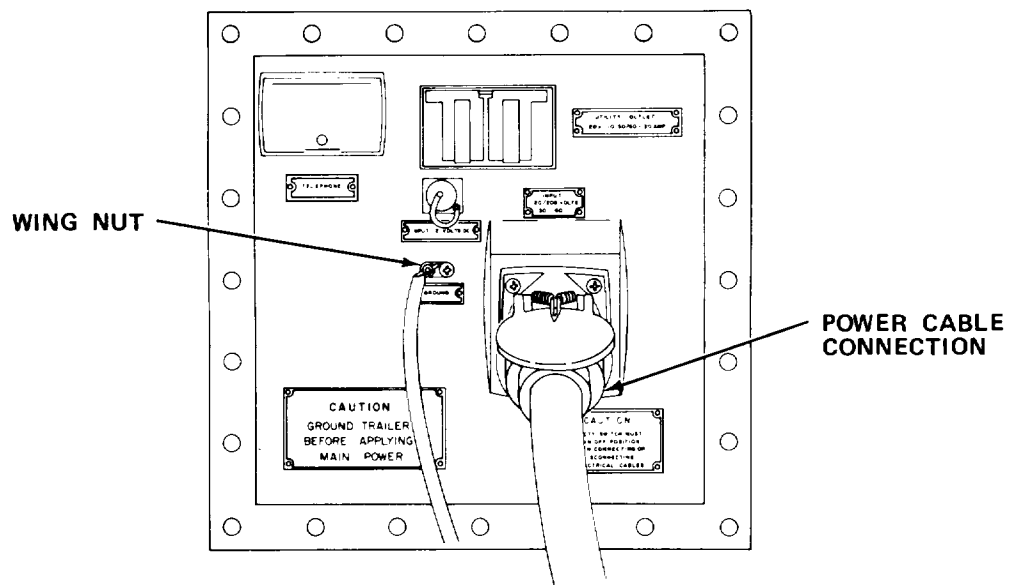


**WARNING**

To prevent death or serious injury, do not handle or clean power cable or connectors when cable is connected to power source.

**NOTE**

The section must be properly grounded before power is connected. If it is not possible to drive the three sections of ground rod fully into ground, the rods may each be driven into the ground separately and connected in series. If it is impossible to drive a ground rod, a suitable alternative ground must be found, such as a buried metal water pipe. See TC 11-6, Grounding Techniques for additional instructions.



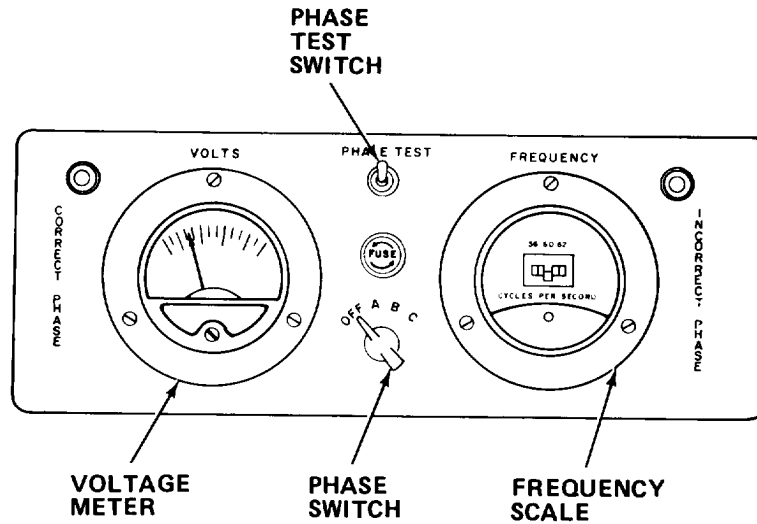
(11) Connect ground cable to ground lug with wing nut.

**CAUTION**

Be sure safety switch is off before connecting power cable to avoid equipment damage.

(12) Firmly connect the power cable to the power receptacle.

(13) Turn on safety switch.



**CAUTION**

Do not energize section if incorrect phase lamp lights. Damage to equipment may result.

(14) Check voltage and frequency as follows:

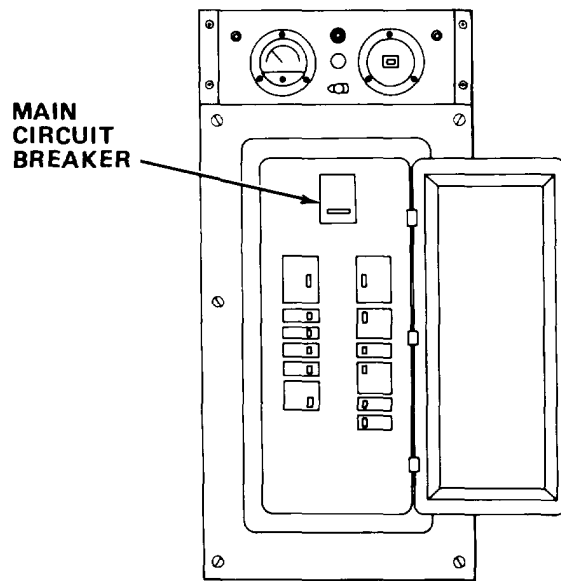
- (a) Push phase test switch. Observe correct phase lamp lights.
- (b) Turn phase switch to A.

**CAUTION**

Voltage must be between 110 and 120, and frequency must be at 60  $\pm$ 1 Hz on each leg before turning on main circuit breaker or damage to equipment may result.

- (c) Read voltage on meter.
- (d) Read frequency on scale.
- (e) Repeat for positions B and C on phase switch.





(15) Set main circuit breaker ON.

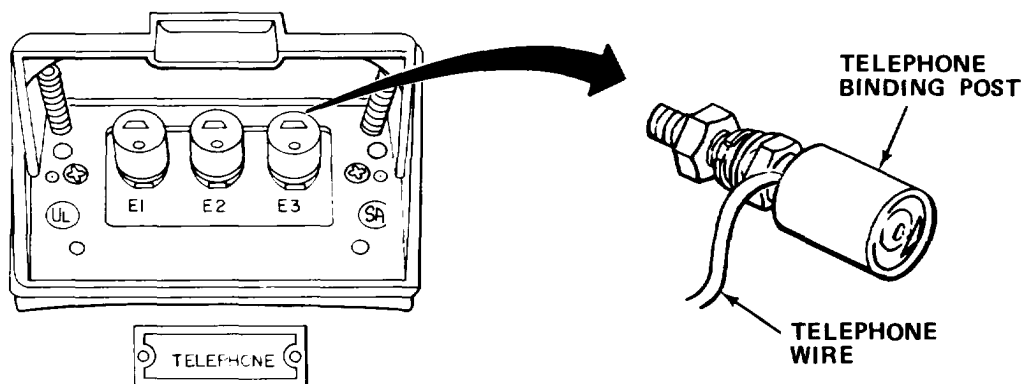
**NOTE**

This step must be accomplished if section is placed in operation in darkness, fog, mist, or under blackout conditions.

(16) Close blackout curtains, if required.

(17) Turn on circuit breakers in following order:

- (a) Individual lighting.
- (b) Curbside and roadside air conditioners/heaters.
- (c) Curbside and roadside receptacles.



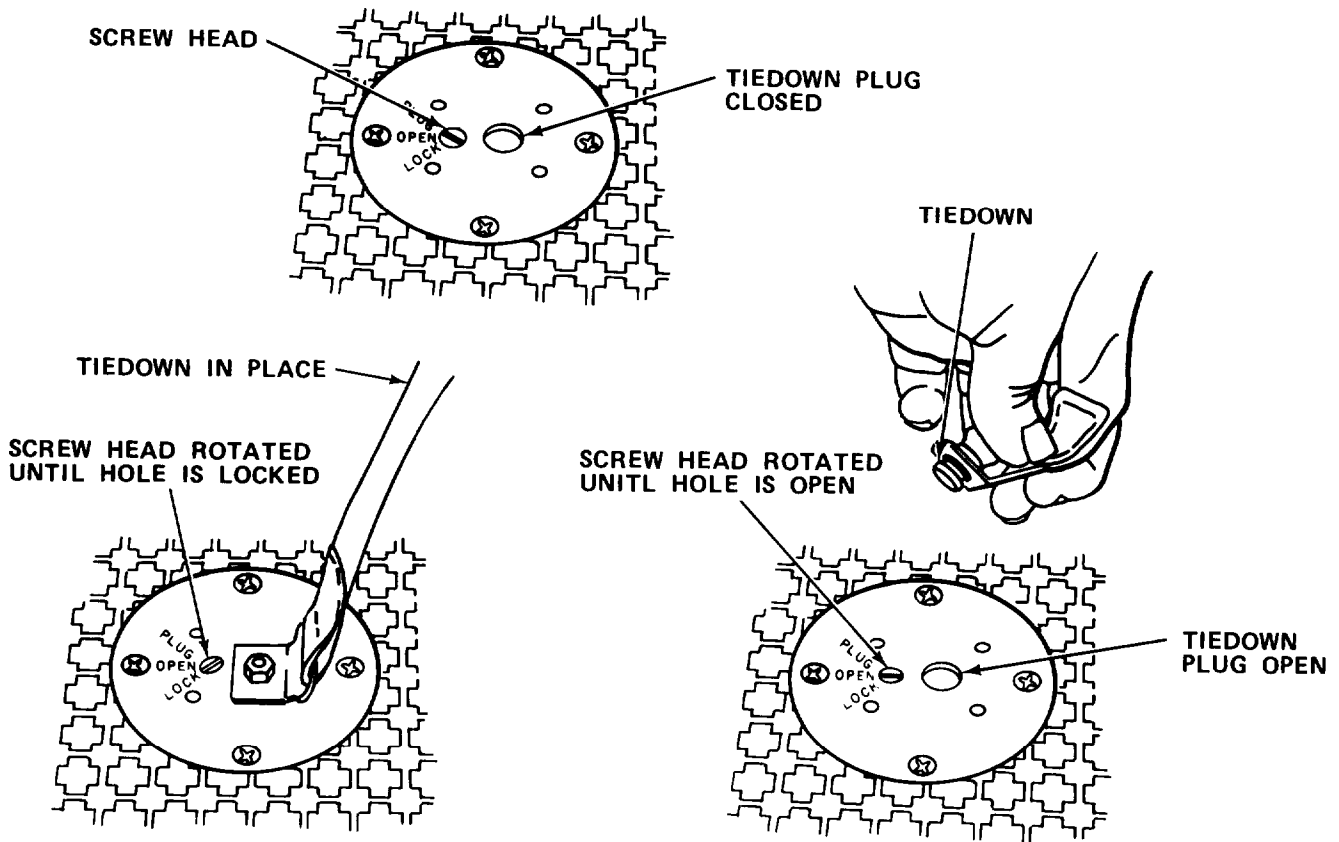
(18) Connect telephone lines to corresponding interior binding posts.

(19) Check blackout switches.

(20) Plug in emergency lighting and turn switch to READY.

1-6.2 Preparation for Movement.

a. Inventory equipment and supplies.



b. Install tiedowns in tiedown sockets.

c. Secure authorized equipment in proper containers or as specified by appropriate chapters.

d. Secure straps and remove slack from tiedowns.

**WARNING**

Death or serious injury may occur if power cable is disconnected from section while power is on.

e. Turn equipment switches OFF.

- f. Turn main circuit breaker OFF.
- g. Turn safety switch OFF.
- h. Have power cable disconnected at power supply end. Then disconnect power cable from receptacle. Put cable in storage box on trailer chassis.
- i. Turn emergency light switch OFF.
- j. Disconnect telephone cables from power entry panel.

### **CAUTION**

To prevent loss of rod or thread damage, do not allow ground rod to rotate and unscrew when removing the slide hammer rod.

- k. Remove ground rod with slide hammer, and put ground rods, couplings, and slide hammer inside section. Clean threads on each ground rod before storing.

### **NOTE**

Be certain exhaust fan and air vent doors are securely closed.

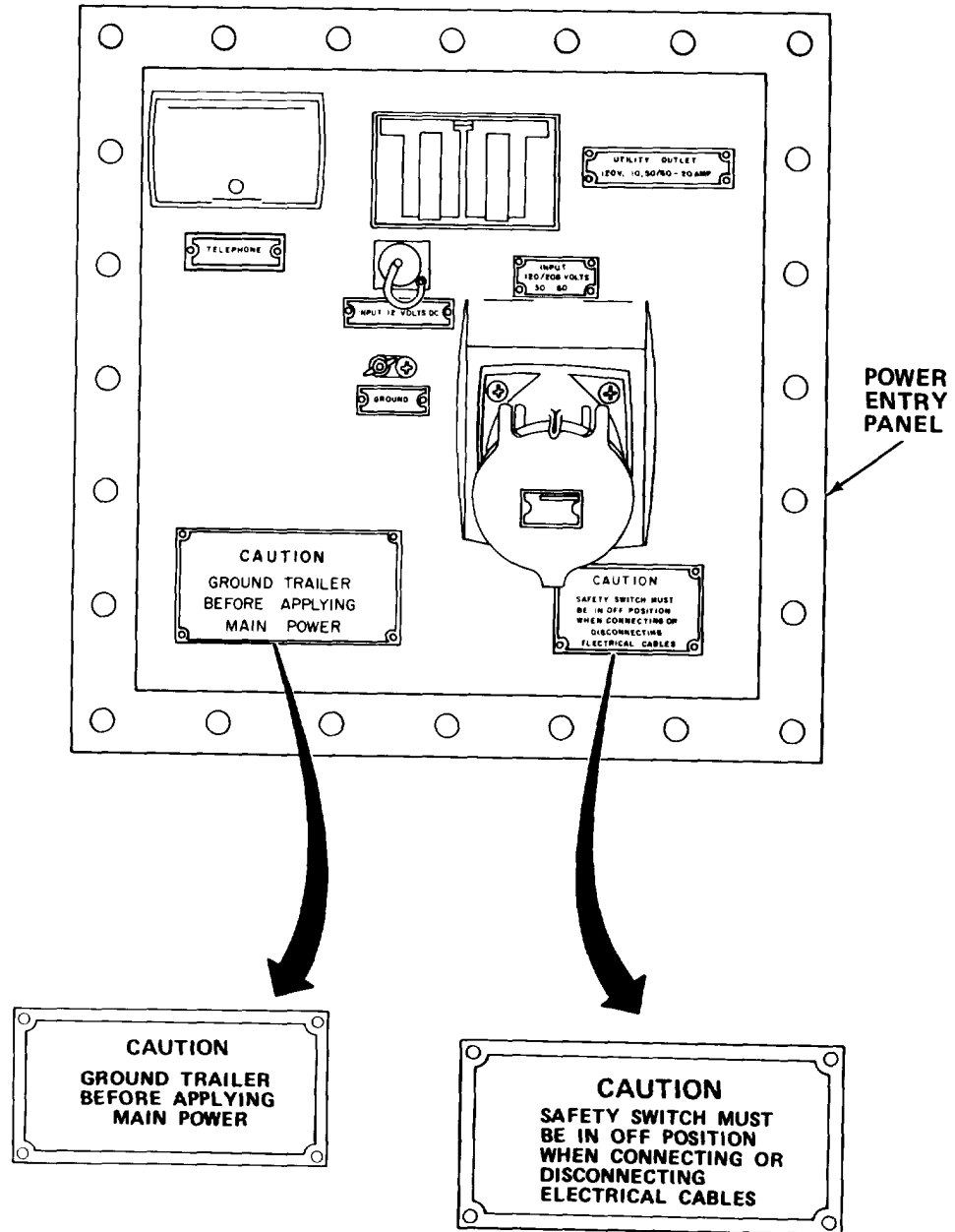
- l. Reinspect section interior for loose equipment and close all vents.
- m. Close section. Secure and lock all personnel doors and cargo door.

### **NOTE**

Be sure air conditioner/heater covers are down and secured.

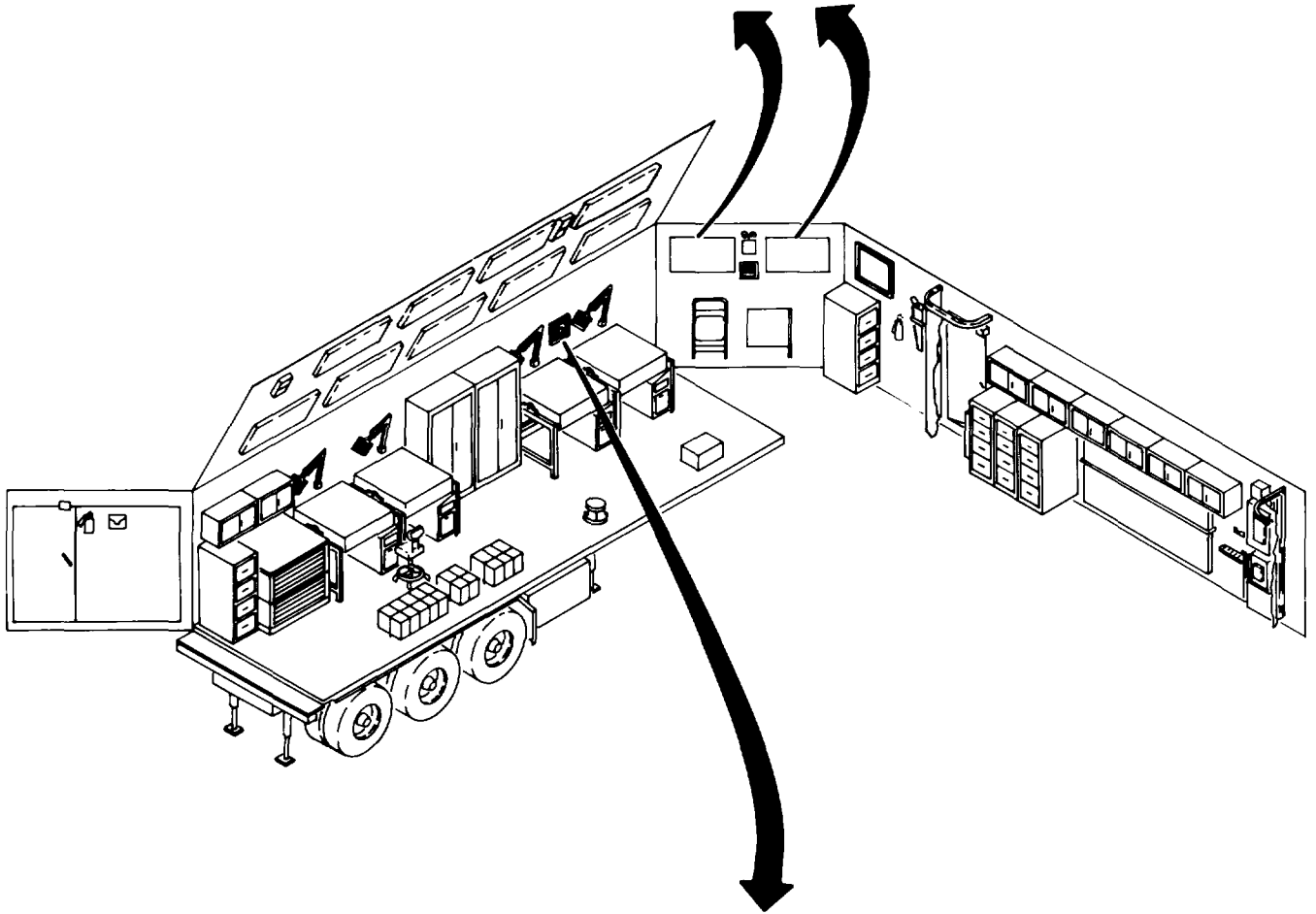
- n. Remove handrails from boarding ladders.
- o. Remove boarding ladders and insert handrails into back of ladders.
- p. Secure ladders to back of section.
- q. Fully extend landing gear.
- r. Retract leveling jacks.
- s. Visually inspect section exterior to be sure all equipment and covers are secured.

1-6.3 Operating Instructions on Decals and Instruction Plates.



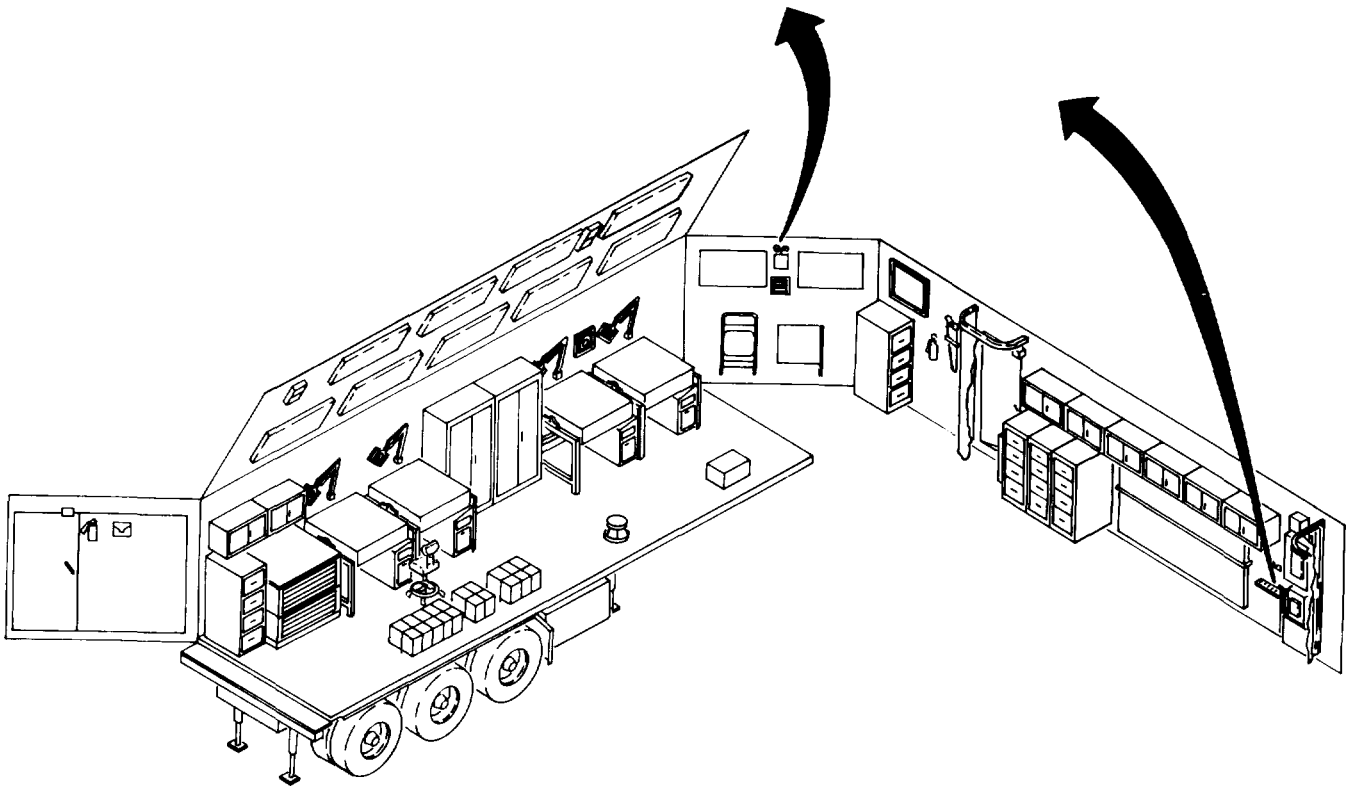
**CAUTION**  
FOR SAFE OPERATION  
SEE TM FOR PROPER  
INTERNAL AND EXTERNAL  
GROUNDING

**CAUTION TO START UNIT ON "COOL"  
MODE AT 0°F AMBIENT  
JUMPER LACO SWITCH (S-5)**

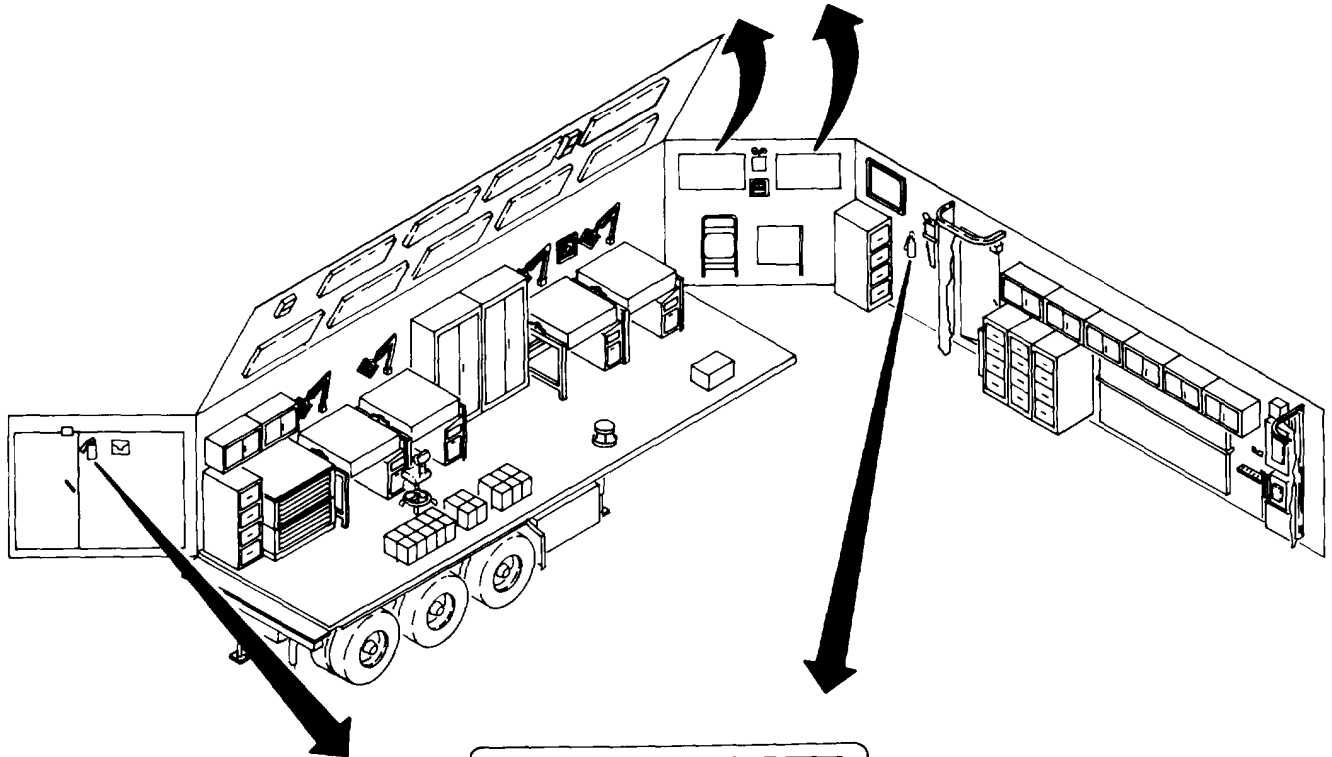


**CAUTION**  
OPEN OUTSIDE VENT BEFORE  
OPERATING FAN

**CAUTION**  
EMERGENCY LIGHT SWITCH  
MUST BE IN THE OFF POSITION  
WHEN ELECTRICAL POWER  
IS INTENTIONALLY DISCONNECTED  
  
SWITCH MUST BE IN THE READY  
POSITION FOR NORMAL EMERGENCY  
LIGHT OPERATION



**CAUTION**  
OPEN OUTSIDE FLAPS  
PRIOR  
TO OPERATING AIR COND



**TO OPERATE**

1. PULL RING PIN
2. POINT HORN CLOSE TO BASE OF FIRE
3. DEPRESS TRIGGER FOR DISCHARGE AND KEEP BASE OF FLAMES COVERED
4. AVOID BREATHING OF SMOKE
5. REMOVE VALVE AND HORN ASSEMBLY AND DISCARD USED CYLINDER

EXTINGUISHER, FIRE, CF<sub>3</sub>BR, 2 3/4 LB

1-7. OPERATION UNDER UNUSUAL CONDITIONS.

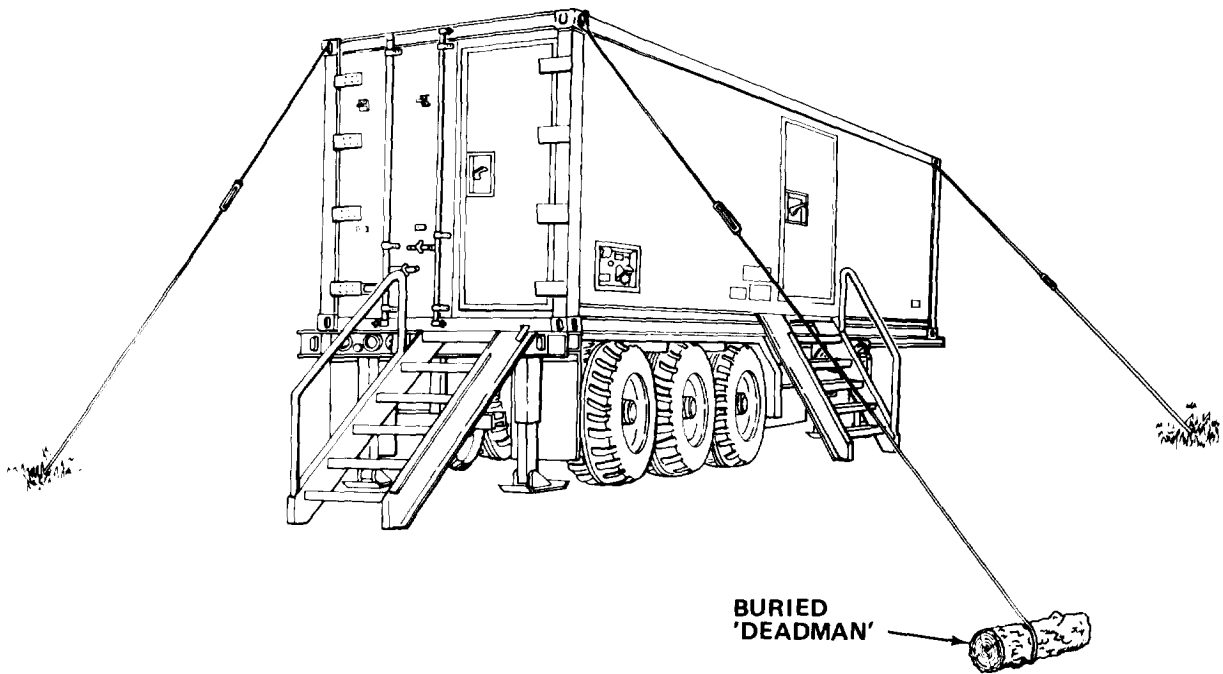
NOTE

Damage to container permitting light leaks, water, or dirt entry must be temporarily repaired using available material on hand. Maintenance personnel will conduct permanent repairs; however, crew must maintain operational capability of section.

1-7.1 Operation in High Wind or Storm Conditions.

- a. Relocate section if trees or structures present hazard.

SUGGESTED METHOD OF ANCHORING THE SECTION IN HIGH WINDS



- b. Secure section corners at lifting eyes to deadmen or substantial objects.
- c. Remove all loose objects from area.

1-7.2 Operation in Cold Weather.

- a. The operation of the internal equipment is performed within environmentally controlled conditions; however, in extreme cold, the main power supply cable and ground cable will become hard, brittle, and difficult to handle. When connecting or disconnecting cables, be careful that kinks and unnecessary loops will not result in permanent damage.



b. Make certain that connections and cable receptacles on the outside of the section are free of frost, snow, and ice.

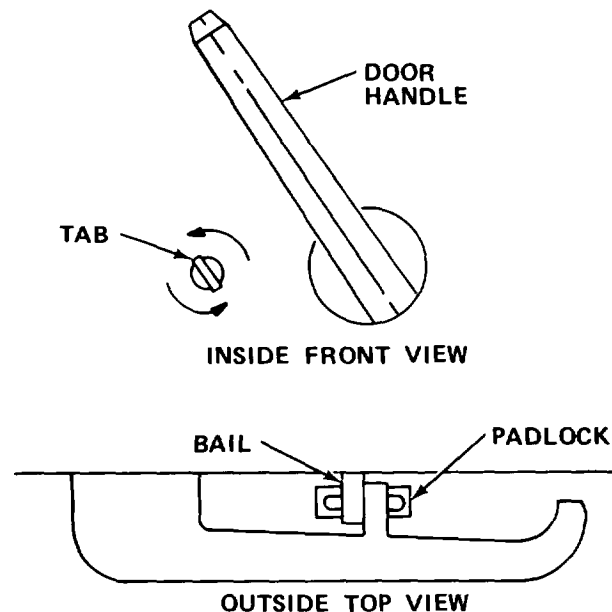
c. When section heaters are not operating or when the section is being transported, liquid consumable supplies may freeze, break their containers, then melt, and ruin equipment or documents. Store these items in an area to prevent equipment and document damage.

1-7.3 Operation in Extreme Heat. The operation of the internal equipment is performed within environmentally controlled conditions; however, during transportation or when air conditioning units are not operating, consumable supplies may suffer reduced shelf life, and internal components may have accelerated deterioration of gaskets, seals, or insulation.

1-7.4 Operation in Tropical Conditions. Fungi, mildew, or mold will form on and in equipment, documents, and supplies if internal environmental control equipment is not operating and outside heat and humidity are allowed to enter the section.

1-7.5 Operation in Desert Conditions. Dust, grit, and sand will ruin supplies, equipment, and documents. Extreme care must be taken to prevent dust, grit, and sand from entering into the section. Air filters will be changed whenever airflow is restricted, and cleaning of section interior must be conducted more frequently than specified by PMCS schedules.

1-7.6 Emergency Procedures. There are no specific emergency procedures for operation of the section.



1-7.7 Emergency Means of Exit. In the event personnel are locked in the section, the tab may be turned to the left until the bail on the padlock falls free. The door handle is now free to turn.

## Section III OPERATOR MAINTENANCE

### 1-8. LUBRICATION INSTRUCTIONS.

a. Lubrication instructions for the Mosaicking/Drafting Section are contained in LO 5-6675-321-12, Lubrication Order, Mosaicking/Drafting Section, Topographic Support System. The intervals and manhours specified in the Lubrication Order are based on normal operations. During inactive periods, lubrication periods may be extended with adequate preservation.

b. Topographic equipment and all optical equipment require special care in lubrication. When a specified lubricant is called for, substitutions are not authorized. Minimum amounts of lubricant are to be used and all excess lubricant is to be immediately removed. Spray lubricants must not be used in the vicinity of optical equipment unless optics are completely protected. No lubricant is to be applied unless a thorough cleaning is conducted first to remove dirt, dust, or abrasive material.

c. Be sure that you refer to the appropriate chapter before any equipment is stored after use, that the temperature has stabilized, and that required lubrication after use is accomplished.

### 1-9. TROUBLESHOOTING PROCEDURES.

a. The table lists the common malfunctions which you may find during operation or maintenance of the Mosaicking/Drafting Section, or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 1-2. TROUBLESHOOTING

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

1. NO ELECTRICAL POWER TO SECTION.

**WARNING**

Death or serious injury may result. Do not perform any electrical maintenance or make electrical connections or disconnections at main power receptacle when power cable is energized.

Step 1. Observe voltage and frequency for phases A, B, and C. Read  $115 \pm 5$  V,  $60 \pm 1$  Hz.

- (a) If voltage and frequency are correct, proceed to step 2.
- (b) If voltage and frequency are incorrect, notify power supply supervisor.

**CAUTION**

Do not energize section if voltage or frequency is not correct. Damage to equipment may result.

Step 2. Press phase test switch on power panel for A, B, and C.

- (a) If phases A, B, and C are correct, proceed to step 3.
- (b) If incorrect phase lamp lights, notify power supply supervisor.

**CAUTION**

Do not energize section if incorrect phase lamp lights. Damage to equipment may result.

Step 3. Check safety switch position.

- (a) If safety switch is ON, proceed to step 4.
- (b) If safety switch is OFF, turn ON.

**Table 1-2. TROUBLESHOOTING - Cont**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. NO ELECTRICAL POWER TO SECTION - Cont	Step 4. Check main circuit breaker position.	<ul style="list-style-type: none"> <li>(a) If circuit breaker is ON, refer to direct/general support maintenance.</li> <li>(b) If circuit breaker is OFF, turn ON.</li> <li>(c) If circuit breaker trips repeatedly, notify power supply supervisor.</li> </ul>
2. NO ELECTRICAL POWER TO EQUIPMENT.	Step 1. Check equipment power switch.	<ul style="list-style-type: none"> <li>(a) If power switch is ON, proceed to step 2.</li> <li>(b) If power switch is OFF, turn ON.</li> </ul>
	Step 2. Check power cord.	<ul style="list-style-type: none"> <li>(a) If power cord is plugged in, proceed to step 3.</li> <li>(b) If power cord is unplugged, plug in.</li> </ul>
	Step 3. Inspect circuit breaker panel for breakers in OFF position.	<ul style="list-style-type: none"> <li>(a) If all circuit breakers are ON, refer to direct/general support maintenance.</li> <li>(b) If any circuit breakers are OFF, turn ON.</li> </ul>

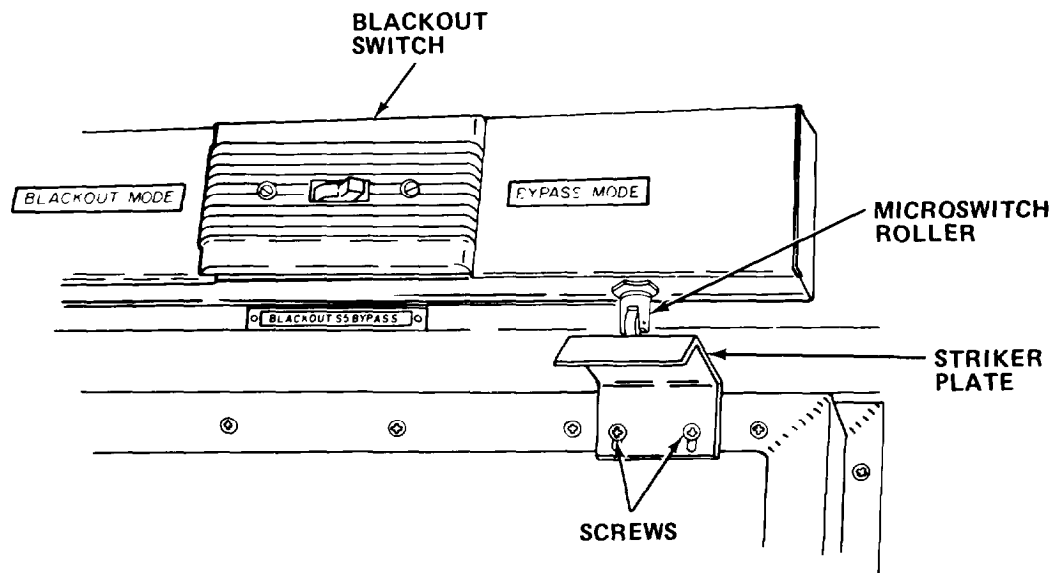
Table 1-2. TROUBLESHOOTING - Cont

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

## 3. BLACKOUT SWITCH DOES NOT OPERATE.



Step 1. Check blackout switch position.

- (a) If switch is ON, proceed to step 2.
- (b) If switch is OFF, reset switch to BLACKOUT.

Step 2. Check to see that striker plate contacts roller on microswitch.

- (a) Loosen screw, and move plate up or down until microswitch operates.
- (b) If blackout switch still fails to operate, refer to organizational maintenance.

**1-10. MAINTENANCE PROCEDURES.**

This section contains instructions covering operator maintenance functions for the Mosaicking/Drafting Section. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Fluorescent Lamp. . . . .	1-10.1
Service Ventilation Ducts. . . . .	1-10.2
Replace Blackout/Dome Light . . . . .	1-10.3

1-10.1 Replace Fluorescent Lamp.

MOS: 81C, Cartographer

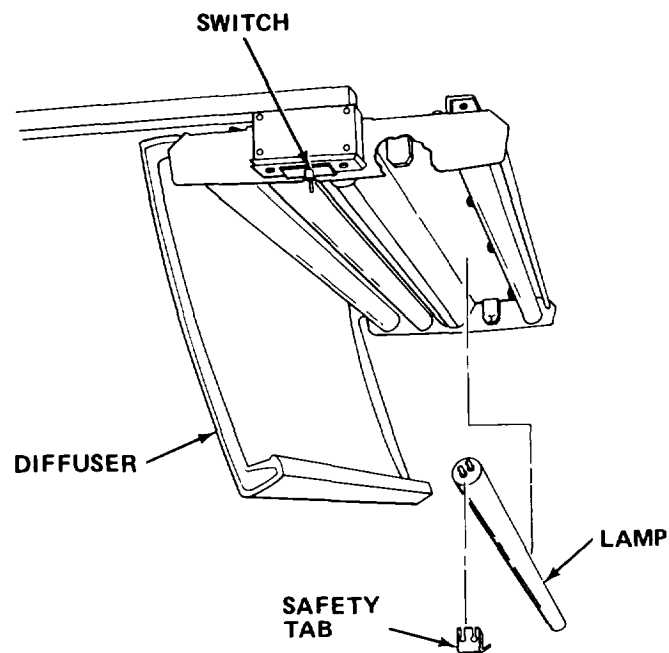
TOOLS: None

SUPPLIES: Fluorescent Lamp

**WARNING**

Death or serious injury may occur if power is left on while servicing lamp.

- a. Turn switch OFF.



- b. Gently pull diffuser from light bracket, and place diffuser out of the way to prevent damage.
- c. Remove safety tab from lamp socket.
- d. Rotate defective lamp until prongs are free from slot and remove.
- e. Insert new lamp prongs into slot and rotate 90°degrees.
- f. Reinstall safety tab into lamp socket.
- g. Reinstall diffuser.
- h. Turn power ON.

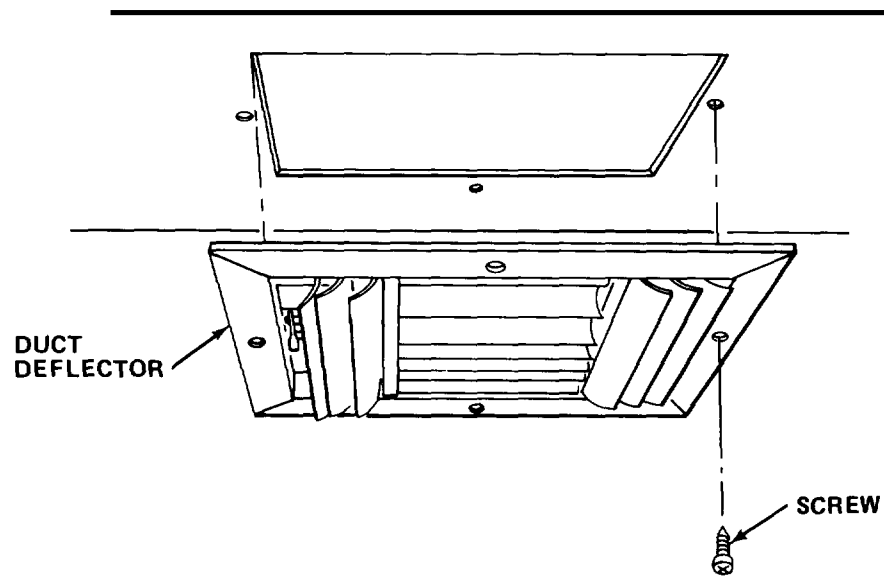
1-10.2 Service Ventilation Ducts.

MOS: 81C, Cartographer

TOOLS: Vacuum Cleaner  
Flat Tip Screwdriver

SUPPLIES: None

- a. Cover equipment to prevent dust from entering equipment.
- b. Close all doors and cabinets.
- c. Remove any documents or other work that may be damaged by dirt/dust.
- d. Turn off air conditioner/heater.



- e. Remove four screws from each ventilation duct deflector.
- f. Remove all duct deflectors.
- g. Vacuum dirt or dust from deflector louvers.
- h. Insert vacuum cleaner probe into ventilation duct at each deflector hole, and vacuum as far as probe will reach.
- i. Reinstall deflectors and secure with four screws.
- j. Turn on air conditioner/heater.
- k. Vacuum any dislodged dirt or dust from interior of section.
- l. Remove covers for operation.



1-10.3 Replace Blackout/Dome Light.

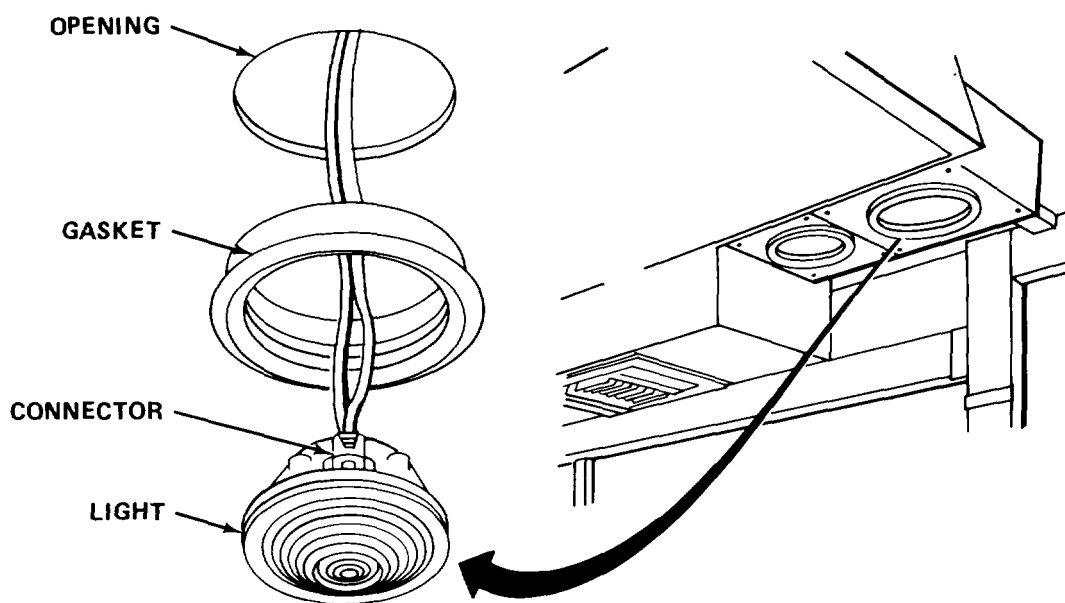
MOS: 81C, Cartographer

TOOLS: None

SUPPLIES: Light (12 V)  
Silicone Spray (Item 20, Appendix E)

**NOTE**

Blackout light and dome light are sealed units. No bulb replacement is possible. Complete light must be replaced.



- a. Push light and gasket up into opening.
- b. Tilt and remove light and gasket from opening.
- c. Disconnect defective light from connector.
- d. Connect new light to connector.
- e. Reinstall gasket in opening.

**NOTE**

The use of silicone spray on the gasket will help to position light.

- f. Position light in gasket and push in.

## Section IV ORGANIZATIONAL MAINTENANCE

**1-11. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication at this level of maintenance.

**1-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT,**

1-12.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

1-12.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

1-12.3 Repair Parts. Repair parts for this equipment are listed in the Repair Parts and Special Tools List, TM 5-6675-321-24P covering organizational maintenance for this equipment.

**1-13. SERVICE UPON RECEIPT.**

### NOTE

The section may be received mounted on a chassis or as a van body for mounting on an available transporter or on site. Inspection of the chassis is covered in TM 5-2330-305-14. Inspection of the air conditioner/heater is covered in TM 5-4120-367-14.

1-13.1 Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

(1) Visually inspect the section exterior starting at the rear to cover rear, curbside, roadside, front, top, and bottom. Inspect for damage, tears, breaks or corrosion.

(2) Enter section and inspect for broken equipment, tool boxes, chairs, or equipment loose and not secured.

(3) Close doors and vents to determine if light leaks exist.

(4) Inspect doors for damage, torn or rotted seals, and tightness of closure.

(5) Inspect interior for evidence of water damage, fungi, mildew or corrosion.

(6) Report damage or discrepancies in accordance with AR 735-11 and AR 735-11-2.

b. Check the equipment against the packing list to see if shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

(1) Inventory sections against Components of End Item and Basic Issue Items Lists (Appendix C).

(2) Inventory expendable supplies contained in section as shown in Appendix E.

(3) Conduct operational checks on equipment in accordance with the chapters in this manual when operators are available and power can be safely provided to the section.

c. Check to see whether the equipment has been modified.

**1-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

a. PMCS are designed to keep the equipment in good working condition by performing certain tests, inspections, and services. The intervals provide you, the organizational technician, with time schedules that determine when to perform specified tasks.

b. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording the results of PMCS.

c. Interval columns. This column determines the time period designated to perform your PMCS.

d. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

e. Preventive maintenance checks and services for the air conditioners/heaters are contained in TM 5-4120-367-14.

f. List of tools and materials required for PMCS is as follows:

<u>I t e m</u>	<u>Quantity</u>
Vacuum Cleaner	1 ea
8 in. Adjustable Wrench	1 ea
Cross Tip Screwdriver	1 ea
Flat Tip Screwdriver	1 ea
Spring Scale	1 ea
Padlock	1 ea
Flashlight	1 ea

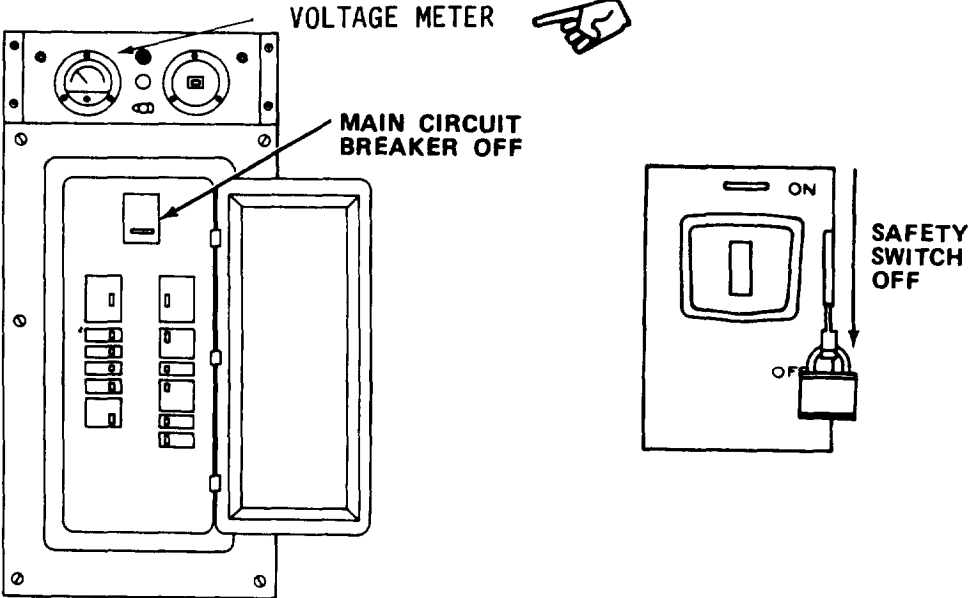
Table 1-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE
<b><u>VAN BODY</u></b>			
1	M	<u>Service Air Conditioner/Heater.</u> Refer to TM 5-4120-367-14 for preventive maintenance checks and services.	
2	M	<u>Service Lighting System.</u>	 <p><b>WARNING</b></p> <p>Do not open or service electrical connections, cables or switches until main power is off, and voltage meter confirms circuit is not energized. Death may result from failure to observe these safety precautions.</p> <ol style="list-style-type: none"> <li>1. Turn off main circuit breaker. Turn off safety switch.</li> <li>2. Padlock safety switch.</li> <li>3. Tighten all loose screws, bolts, and clamps.</li> </ol>

**Table 1-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	IN-TERVAL	ITEM TO BE INSPECTED PROCEDURE
2	M	<p><b>VAN BODY - Cont</b></p> <p><u>Service Lighting System - Cont</u></p> <ol style="list-style-type: none"> <li>4. Check which switches, switch plate outlets, receptacles, and posts require repair.</li> <li>5. Check for loose screws and nuts on ceiling, console lights, circuit breaker panels, and conduits.</li> <li>6. Remove padlock.</li> <li>7. Turn on main circuit breaker and safety switch.</li> </ol>
3	M	<p><u>Service Air Vent.</u></p> <div> <p>The diagram shows a rectangular air vent assembly. On the left is a 'GRILLE' (grille) with horizontal slats, held in place by a 'SCREW'. To its right is the 'AIR VENT' housing. The housing has a 'DOOR' on the right side with a handle. A 'SCREEN' is visible inside the housing behind the door. Arrows point from the labels to the corresponding parts of the assembly.</p> </div> <ol style="list-style-type: none"> <li>1. Remove screws from front of grille.</li> <li>2. Remove front grille.</li> <li>3. Using vacuum cleaner, clean screens on side doors. Vacuum inside of air vent.</li> <li>4. Reinstall grille and secure with screws.</li> </ol>

Table 1-3. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURE
<b><u>VAN BODY - Cont</u></b>			
4	M	<u>Inspect Fire Extinguisher.</u>	
	S		<ol style="list-style-type: none"> <li>1. Remove from mounting bracket. Check free movement of bracket.</li> <li>2. Inspect nozzle and adapter assembly for damage.</li> <li>3. Inspect seal. Be sure it is not broken.</li> <li>4. Weigh cylinder. Replace if gross weight has decreased by 6 oz (170 g) or more.</li> </ol>

**1-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.**

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the facing schematic or the foldout located at the end of this manual for further fault analysis.

d. If any component of the Mosaicking/Drafting Section does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power troubleshooting procedures for dead receptacle (Table 1-4).

**Table 1-4. ORGANIZATIONAL TROUBLESHOOTING**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

**WARNING**

Electrical shock hazard. Be sure power is off when checking continuity at troubleshooting points. Death or serious injury could result from failure to do so.

**1. FLUORESCENT CEILING LAMP IS INOPERATIVE.**

Step 1. Check for continuity of fluorescent lamp switch.

(a) If continuity exists, proceed to step 2.

(b) If continuity does not exist, replace switch (paragraph 1-16.3).

Step 2. Check for continuity of lamp ballast.

(a) If continuity exists, proceed to step 3.

(b) If continuity does not exist, replace lamp ballast (paragraph 1-16.)1.

Table 1-4. ORGANIZATIONAL TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. FLUORESCENT CEILING LAMP IS INOPERATIVE - Cont	Step 3. Check for shorts in RF filter.	Replace RF filter (paragraph 1-16.2).
2. VENTILATION FAN IS INOPERATIVE.	Check on/off switch for continuity.	(a) If continuity exists, replace fan (paragraph 1-16.9). (b) If continuity does not exist, replace switch (paragraph 1-16.4).
3. EMERGENCY LIGHTS ARE INOPERATIVE.	Press in test indicator.	If lamps do not light, replace emergency light assembly (paragraph 1-16.11).
4. NO POWER TO EQUIPMENT.	Step 1. Check circuit breaker ON/OFF position.	(a) If circuit breaker is ON, proceed to step 2. (b) If circuit breaker is OFF, turn ON. (c) If circuit breaker trips repeatedly, notify power supply supervisor.
	Step 2. Check circuit breaker input for 120 V ac.	(a) If input voltage is present, proceed to step 3. (b) If input voltage is not present, refer to direct/general support maintenance for repair or replacement of defective wiring.



**Table 1-4. ORGANIZATIONAL TROUBLESHOOTING - Cont**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. NO POWER TO EQUIPMENT - Cont		
	Step 3. Check circuit breaker output for 120 V ac.	(a) If output voltage is present, proceed to step 4. (b) If output voltage is not present, refer to direct/general support maintenance for circuit breaker replacement (paragraph 1-20.5).
	Step 4. Remove receptacle and check for 120 V ac input.	(a) If present, replace receptacle (paragraph 1-16.6). (b) If not present, refer to direct/general support maintenance for repair or replacement of defective wiring.

**1-16. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering organizational maintenance functions for the Mosaicking/Drafting Section. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Fluorescent Lamp Ballast . . . . .	1-16.1
Replace Radio Frequency (RF) Filter . . . . .	1-16.2
Replace Fluorescent Lamp Switch . . . . .	1-16.3
Replace On/Off Switch. . . . .	1-16.4
Replace Blackout/Dome Light Microswitch . . . . .	1-16.5

INDEX - Cont

PROCEDURE	PARAGRAPH
Replace Receptacle . . . . .	1-16.6
Replace Wire Molding . . . . .	1-16.7
Repair Telephone Binding Post Assembly . . . . .	1-16.8
Replace Exhaust Fan. . . . .	1-16.9
Replace Exhaust Fan Cover. . . . .	1-16.10
Replace Emergency Light Assembly . . . . .	1-16.11
Repair Blackout Curtain . . . . .	1-16.12
Repair Van Body Skin (Temporary) . . . . .	1-16.13
Replace Tiedown Socket . . . . .	1-16.14
Repair Level Indicator . . . . .	1-16.15
Replace Air Vent Screen. . . . .	1-16.16
Replace Air Vent Cover . . . . .	1-16.17
Repair Personnel Ladder. . . . .	1-16.18

1-16.1 Replace Fluorescent Lamp Ballast.

MOS: 83FJ6, Reproduction Equipment Repairer

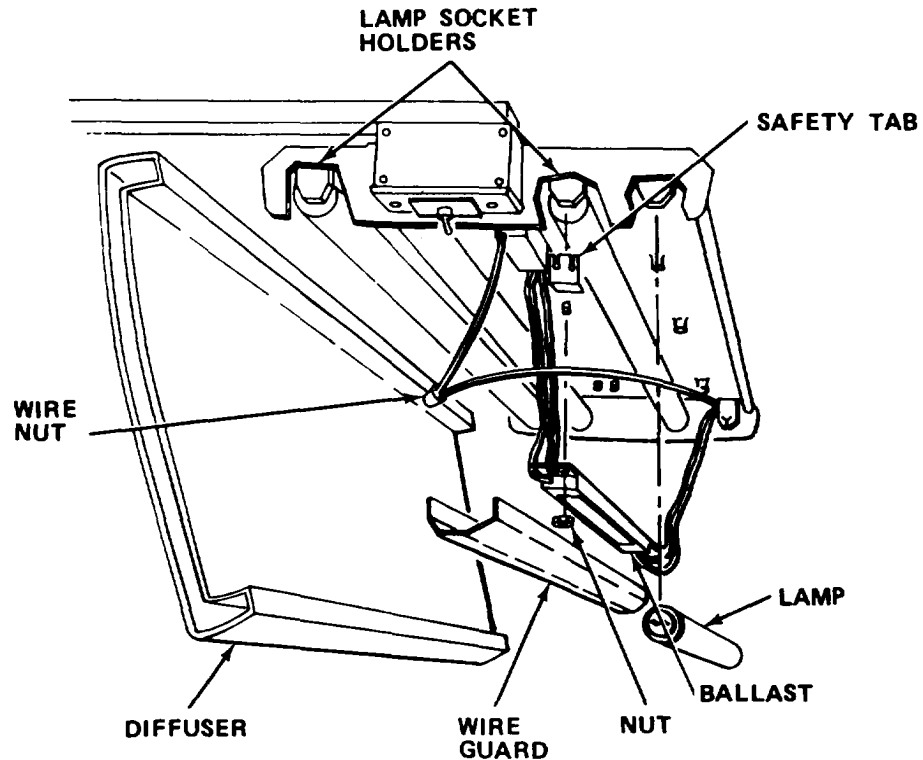
TOOLS: Flat Tip Screwdriver  
1/4 in. Wrench  
1/4 in. Drive Socket Set  
Scribe

SUPPLIES: Lamp Ballast  
Wire Ties

**WARNING**

Death or serious injury may occur unless overhead light circuit breaker and main circuit breaker are turned off before working on light fixture.

- a. Turn off overhead light, circuit breaker and main circuit breaker.



- b. Remove diffuser from light fixture.
- c. Remove safety tabs and lamps. Place in diffuser.
- d. Squeeze light wiring guard and remove.
- e. Remove wire ties as required.
- f. Tag wires from ballast for reference.
- g. Disconnect ballast wire from wire nut connection.
- h. Pry out lamp socket holder with flat tip screwdriver.
- i. Using scribe, depress wire clips and disconnect ballast wiring.
- j. Remove nut and defective ballast.
- k. Install new ballast and connect wires to corresponding lamp socket holders.
- l. Secure with nut.
- m. Reconnect ballast wire to wire nut connection.
- n. Remove tags.
- o. Install new wire ties.

**NOTE**

Be sure wires are free of kinks and do not interfere with placement of wire guard.

- p. Reinstall wire guard.
- q. Reinstall lamp and safety tabs.
- r. Reinstall diffuser.
- s. Turn on overhead light circuit breaker and main circuit breaker.

1-16.2 Replace Radio Frequency (RF) Filter.

MOS: 83FJ6, Reproduction Equipment Repairer

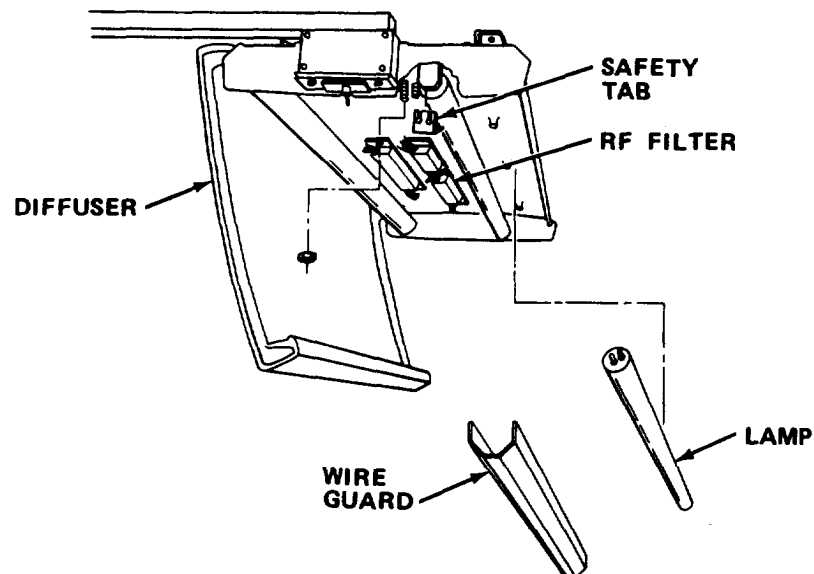
TOOLS: Flat Tip Screwdriver  
1/4 in. Wrench  
1/4 in. Drive Socket Set

SUPPLIES: RF Filter  
Wire Ties

**WARNING**

Death or serious injury may occur unless overhead light switch is turned OFF before working on light fixture.

- a. Turn overhead light switch OFF.



- b. Remove diffuser from light fixture.

- c. Remove safety tabs and lamps. Place in diffuser.
- d. Squeeze light wiring guard and remove.
- e. Remove wire ties as required.
- f. Tag wires to filter.
- g. Remove wire nuts and disconnect filter wires.
- h. Remove nuts and defective filter.
- i. Install new filter. Secure with nuts.
- j. Reconnect filter wires and secure with wire nuts.
- k. Remove tags.
- l. Install new wire ties.

**NOTE**

Be sure wires are free of kinks and do not interfere with placement of wire guard.

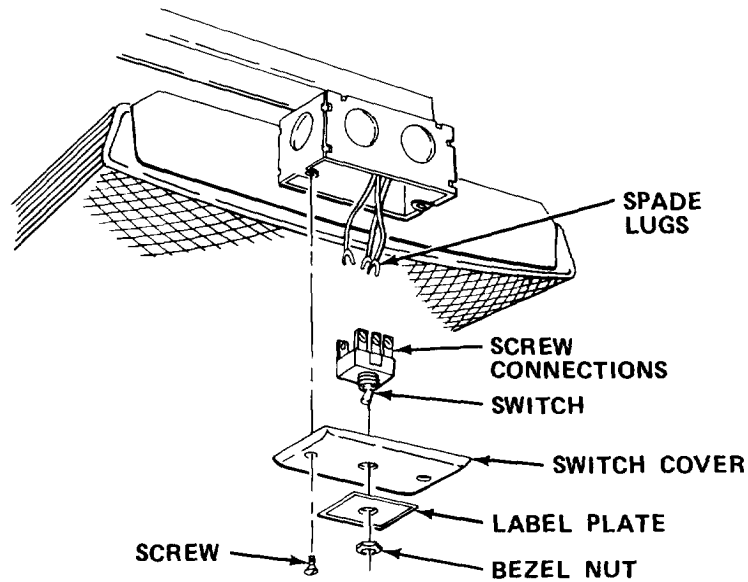
- m. Reinstall wire guard.
- n. Reinstall lamps and safety tabs.
- o. Reinstall diffuser.
- p. Turn on light switch.

1-16.3 Replace Fluorescent Lamp Switch.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Needle Nose Pliers  
Flashlight

SUPPLIES: Switch Assembly



**WARNING**

Death or serious injury may occur if lighting circuit breaker is not turned off before working on lamp assembly.

**NOTE**

Alternate lighting is required to perform this task.

- a. Turn circuit breaker OFF.
- b. Remove bezel nut.
- c. Note notch on label plate and remove label plate.
- d. Loosen screws.

**NOTE**

Note position of cover and reinstall as noted.

- e. Remove cover plate.
- f. Tag and disconnect wires from defective switch.
- g. Install new switch and connect wires.
- h. Insert switch through cover plate and label plate.

**NOTE**

Be sure label plate is in same direction as when removed. Secure with bezel nut.

- i. Aline cover plate with holes and secure with screws.
- j. Turn circuit breaker ON.

1-16.4 Replace On/Off Switch.

MOS: 83FJ6, Reproduction Equipment Repairer

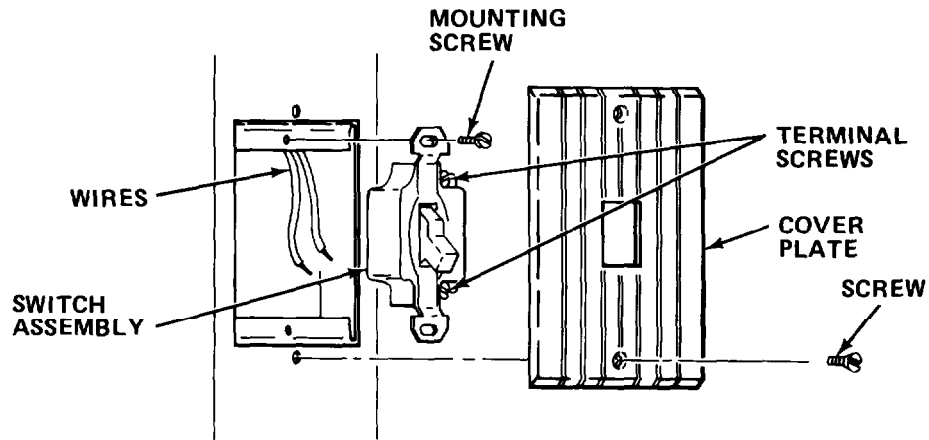
TOOLS: Flat Tip Screwdriver

SUPPLIES: Switch

**WARNING**

Death or serious injury may occur if switch circuit breaker is not turned off before working on switch.

- a. Turn off appropriate circuit breaker.



- b. Remove screws.
- c. Remove cover plate.
- d. Remove mounting screws.
- e. Pull switch assembly from wire guide to gain access to wires.
- f. Loosen terminal screws; then disconnect wires.
- g. Install new switch.
- h. Reconnect wires.
- i. Guide switch into wire guide, alining holes.

**NOTE**

Be sure wires are not kinked or strained.



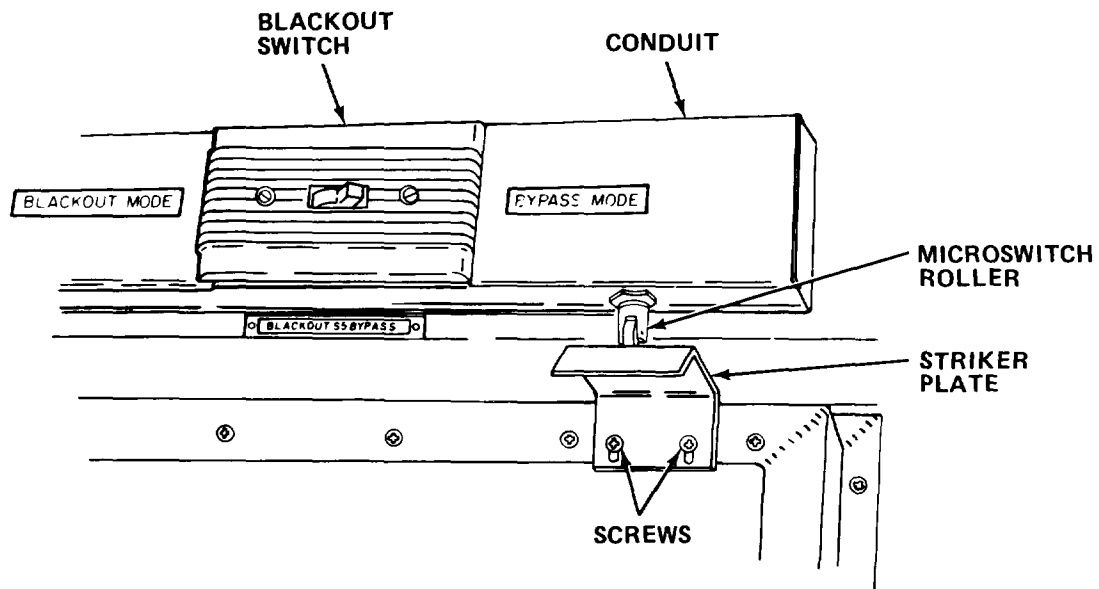
- j. Reinstall mounting screws.
- k. Reinstall cover plate and secure with screws.
- l. Turn on switch circuit breaker.

#### 1-16.5 Replace Blackout/Dome Light Microswitch.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
6 in. Adjustable Wrench

SUPPLIES: Microswitch



#### **WARNING**

Death or serious injury may occur from electrical shock unless power is off before servicing.

- a. Turn off blackout/dome light circuit breaker.
- b. Remove conduit cover.
- c. Remove nut and pull out switch to expose wiring.
- d. Disconnect wires from defective switch.
- e. Connect wires to new switch.
- f. Install switch and secure with nut.

- g. Adjust striker plate until plate contacts rollers.
- h. Reinstall conduit cover.
- i. Turn on circuit breaker.

1-16.6 Replace Receptacle.

MOS: 83FJ6, Reproduction Equipment Repairer

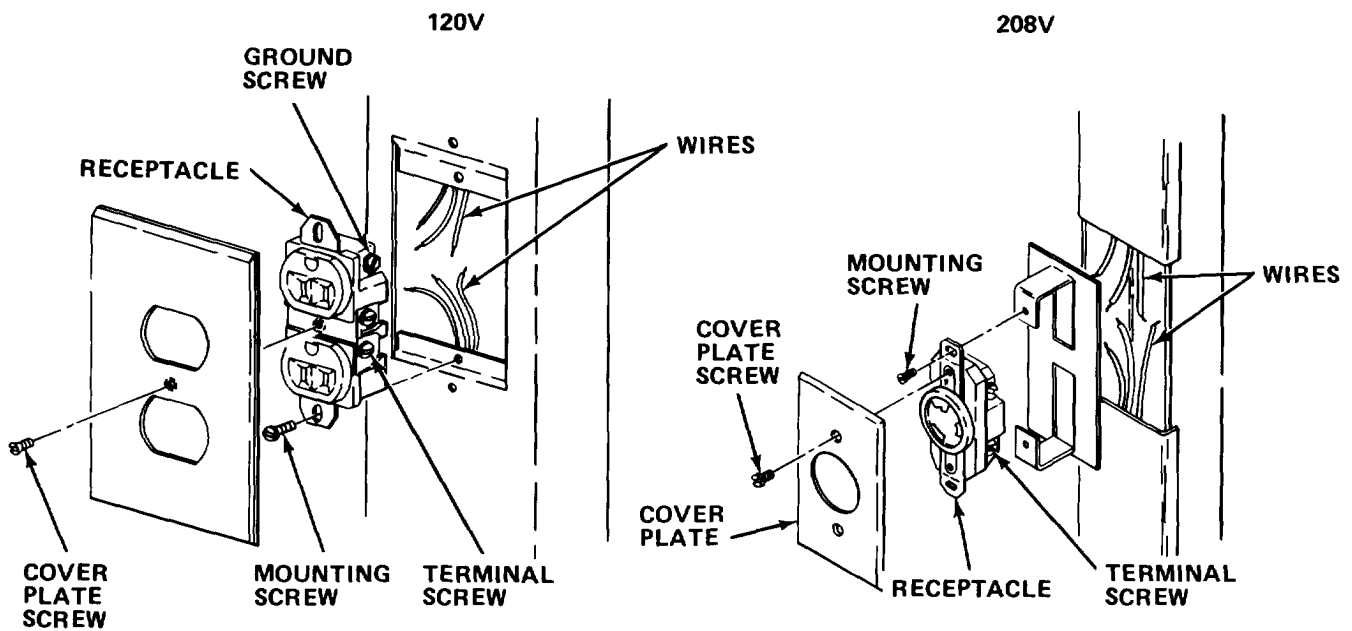
TOOLS: Flat Tip Screwdriver

SUPPLIES: Receptacle

**WARNING**

Death or serious injury may occur if receptacle circuit breaker is not turned off before working on receptacle.

- a. Turn off receptacle circuit breaker.



- b. Remove cover plate screws.
- c. Remove cover plate.
- d. Remove mounting screws.
- e. Withdraw receptacle to gain access to wires.

- f . Loosen terminal screws and ground screw. Then disconnect wires.
- g . Reconnect wires. Connect green (ground) wire first.
- h . Install new receptacle.
- i . Guide receptacle into wire guide.

**NOTE**

Be sure wires are not kinked or strained.

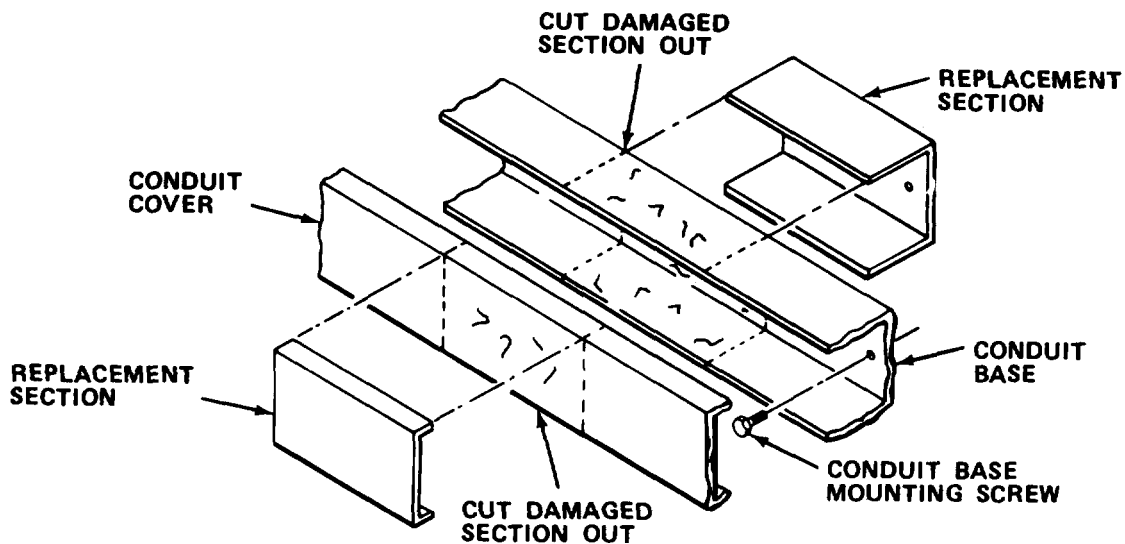
- j . Secure receptacle with screws.
- k . Reinstall cover plate. Secure with screws.
- l . Turn on receptacle circuit breaker.

1-16.7 Replace Wire Molding.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Hacksaw  
Flashlight  
Paint Brush  
Multimeter  
Drill and Bits  
File  
Machinist Rule

SUPPLIES: Paint (Item 13, Appendix E)  
Cheesecloth (Item 5, Appendix E)  
Conduit Base  
Conduit Cover  
Padlock



**WARNING**

Death or serious injury may occur from failure to turn off and padlock safety switch before repairing molding.

**NOTE**

Alternate lighting is required to perform this task.

- a. Turn off and padlock safety switch.
- b. Remove conduit cover.

- c. Inspect wires for damage.

**NOTE**

Refer to direct support maintenance for wiring repair if necessary.

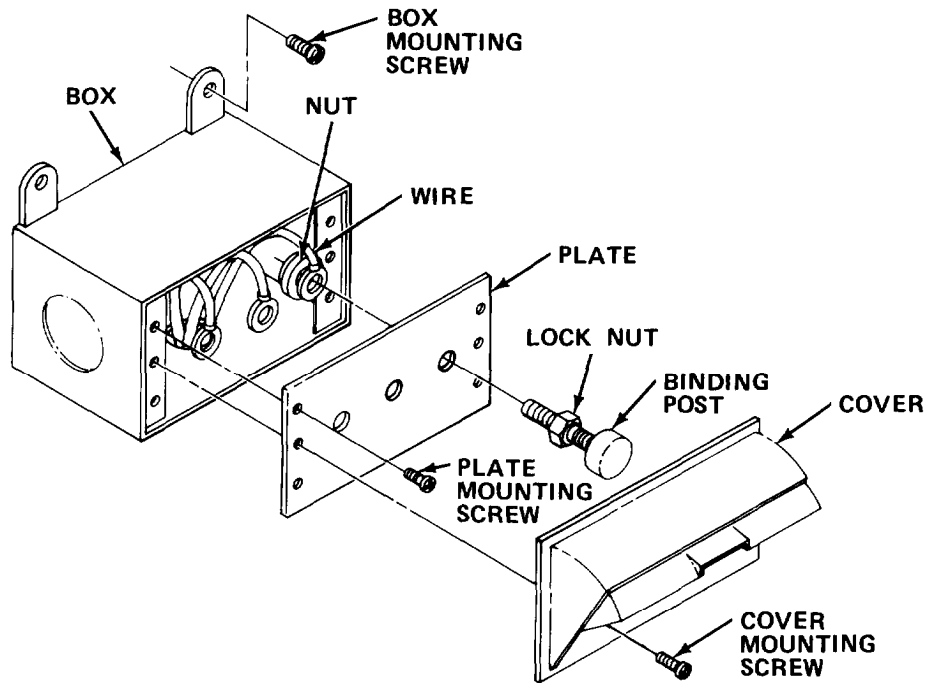
- d. Loosen wiring and carefully pull it from the entire base section.
- e. Remove screws and base from wall.
- f. Mark and measure damaged area on molding. Record measurement.
- g. Cut damaged area from molding.
- h. Cut section from new molding to the length recorded in step f.
- i. Using damaged area as a template, mark mounting holes on new piece.
- j. With a number 25 drill bit, drill holes in new molding.
- k. With file, remove all burred edges.
- l. Paint base section as required.
- m. Reinstall conduit base on wall with screws.
- n. Carefully place wiring back in conduit base.
- o. Reinstall cover on base.
- p. Test wiring for continuity between power wires and conduit. If there is continuity, determine and correct grounding fault.
- q. Test wiring with power on.

1-16.8 Repair Telephone Binding Post Assembly.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver  
1/2 in. Combination Wrench

SUPPLIES: Binding Post Box  
Binding Posts



- a. Remove cover mounting screws. Remove cover.
- b. Remove plate mounting screws to gain access to back of plate.
- c. Tag wires for identification.
- d. Remove nuts and wires from binding posts.
- e. If required, remove box mounting screws and replace box.
- f. Replace any defective binding posts. Secure wires to new posts and remove tags.
- g. Reinstall box assembly and plate, and secure plate with screws.
- h. Secure cover with screws.

1-16.9 Replace Exhaust Fan.

MOS: 83FJ6, Reproduction Equipment Repairer

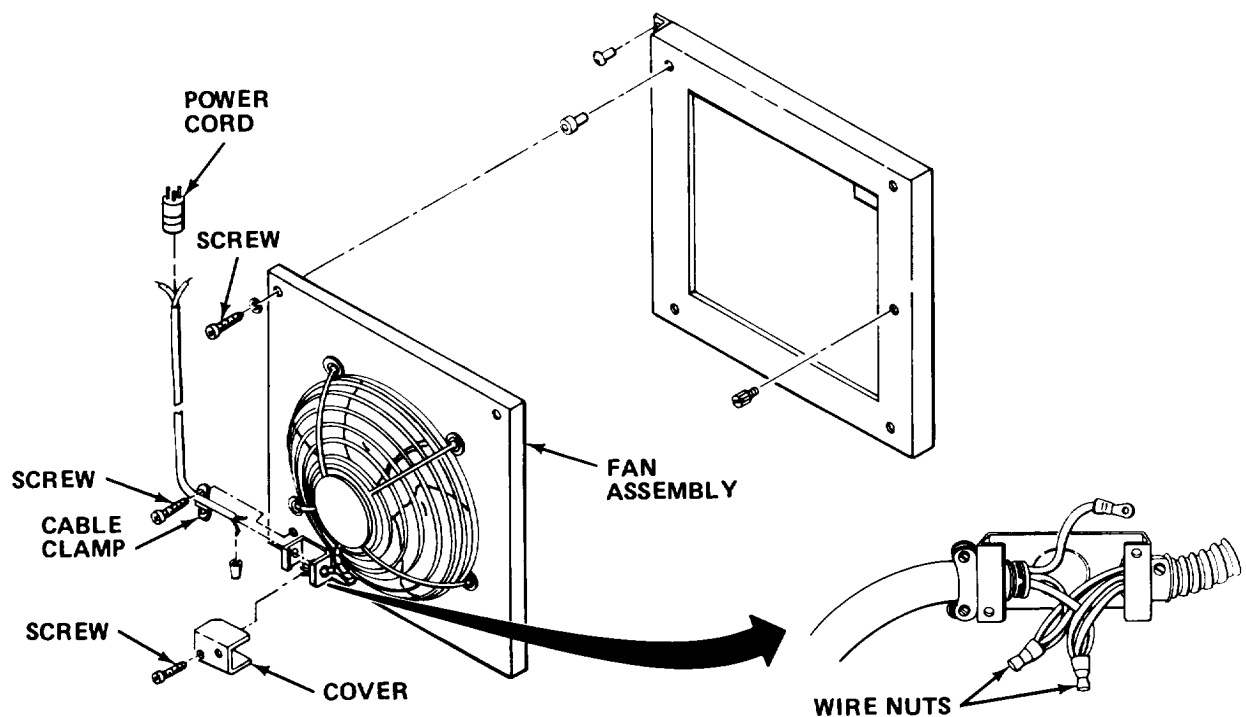
TOOLS: Flat Tip Screwdriver  
Cross Tip Screwdriver  
Wire Cutters

SUPPLIES: Fan Assembly  
Wire Nuts  
Power Cord

**WARNING**

Death or serious injury may occur if power is left on. Turn fan switch OFF and unplug power cord before working on ventilation fan.

- a. Unplug power cord.



- b. Remove screws and place fan assembly on work surface.  
c. Loosen screws on cable clamp.  
d. Remove screws and cover.  
e. Tag wires and cut connectors from wires.

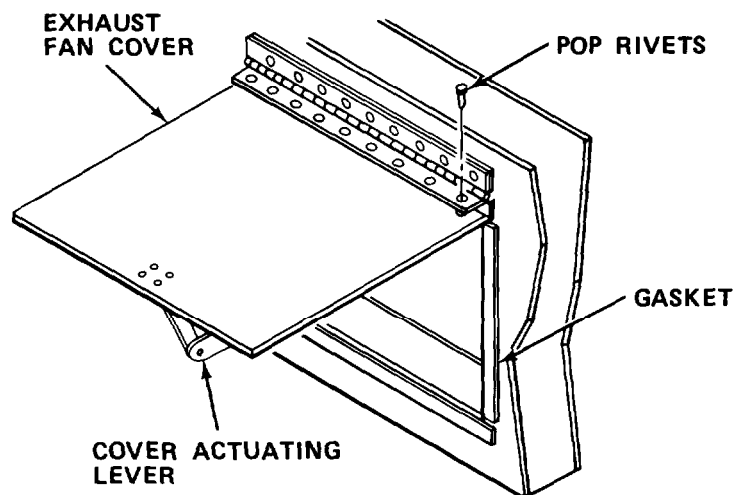
- f. Remove power cord from defective fan assembly.
- g. Install new fan.
- h. Install new power cord.
- i. Connect wires with wire nuts and remove tags.
- j. Tighten cable clamp screws.
- k. Reinstall cover. Secure with screws.
- l. Reinstall fan assembly. Secure with screws.
- m. Plug in power cord.

1-16.10 Replace Exhaust Fan Cover.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Drill and Bits  
Pop Rivet Gun  
Scraper

SUPPLIES: Pop Rivets  
Ventilation Fan Cover  
Gasket  
Solvent P-D-680 (Item 19, Appendix E)  
Adhesive (Item 2, Appendix E)  
Cheesecloth (Item 5, Appendix E)  
Impermeable Gloves  
Goggles





- a. Drill pop rivets from hinged cover to remove vent cover.
- b. Remove defective vent cover and transfer mounted hardware to new cover.

---

**WARNING**

---

Dry cleaning solvent, P-D-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent-impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

- c. Scrape gasket off section and clean area with solvent P-D-680.
- d. Secure new gasket to section with adhesive.
- e. Aline ventilation fan vent cover and pop rivet to hinge.
- f. Test cover for tightness of closure.

1-16.11 Replace Emergency Light Assembly.

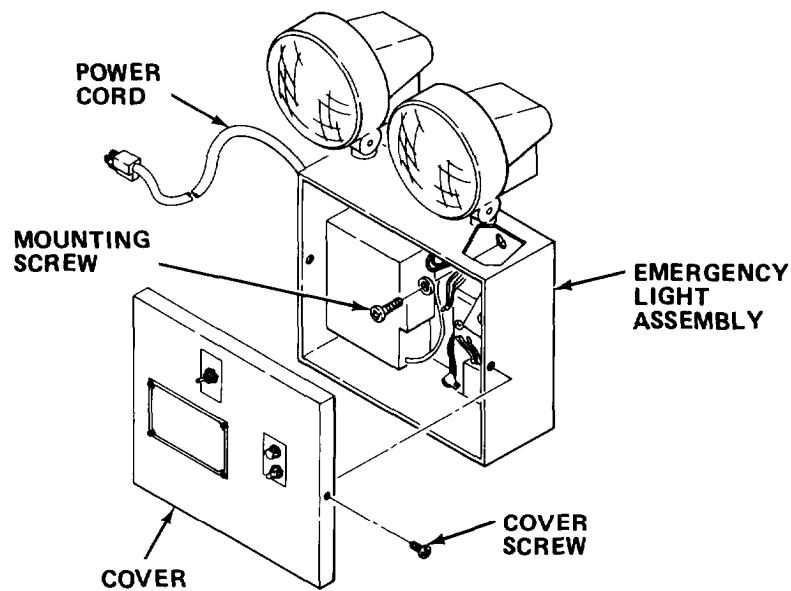
MOS: 35E, Special Electronics Devices Repairer

TOOLS: Cross Tip Screwdriver  
Flat Tip Screwdriver

SUPPLIES: Emergency Light Assembly

**WARNING**

Death or serious injury may occur if power cord is not unplugged before servicing light.



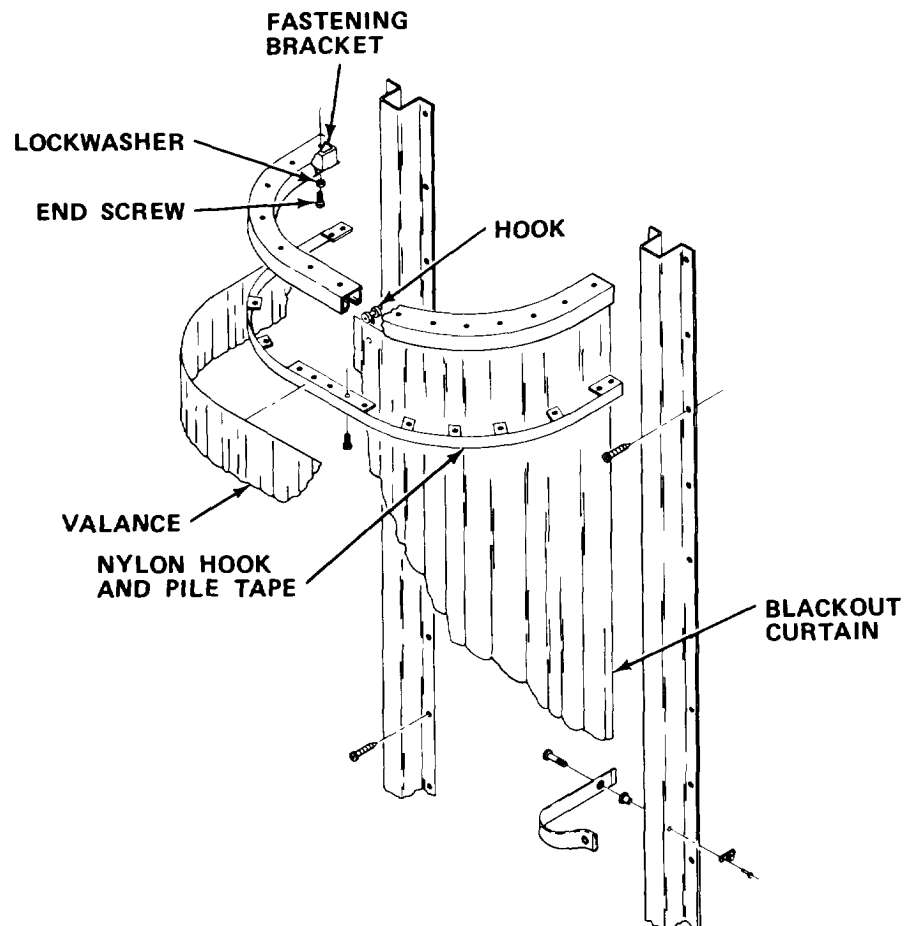
- a. Unplug power cord.
- b. Remove cover screws. Move cover out of way.
- c. Remove mounting screws.
- d. Remove emergency light assembly.
- e. Install new emergency light assembly. Secure with screws.
- f. Secure cover with screws.
- g. Plug in power cord.

1-16.12 Repair Blackout Curtain.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver

SUPPLIES: Hooks  
 Valance  
 Curtain  
 Nylon Hook and Pile Tape  
 Adhesive (Item 1, Appendix E)



- a. Remove curtain from hooks.
- b. Pull curtain and valance from nylon hook and pile tape.
- c. Remove end screw, lockwasher, and fastening bracket from ceiling.
- d. Replace damaged hooks.
- e. Reinstall fastening bracket with hooks. Fasten with end screw and lockwasher.

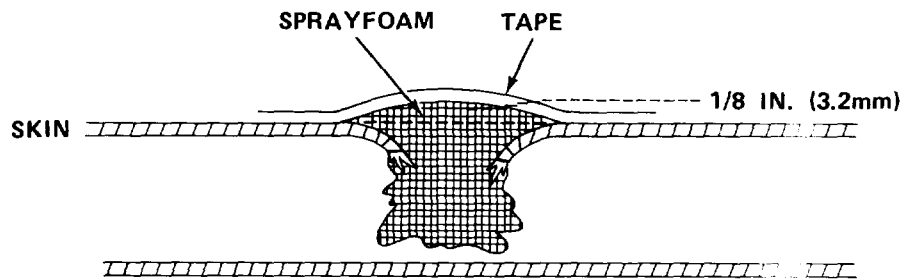
- f. Glue loose nylon hook and pile tape to wall or bracket. Replace tape if worn out.
- g. Hook curtain to bracket.
- h. Attach valance.
- i. Check curtain for free movement.

1-16.13 Repair Van Body Skin (Temporary).

MOS: 52C, Utilities Equipment Repairer

TOOLS: Pliers  
Ball Peen Hammer  
Scissors or Utility Knife

SUPPLIES: Cloth Duct Sealing Tape (Item 22, Appendix E)  
Silicone Sealant (Item 17, Appendix E)  
Sprayfoam (Item 21, Appendix E)  
Cheesecloth, (Item 5, Appendix E)



- a. Bend broken edges of punctured skin inward into puncture hole. Do not attempt to remove fragments of skin by bending or pulling outward. Bend skin inward only enough to put broken edges below surface of unbroken skin.
- b. Remove any loose fragments of foam which are not now held in place by bent broken skin. Removing small pieces of foam or dust is more important than removing chunks.
- c. Using cloth slightly dampened with water, wipe area around puncture to remove any dirt or mud and wipe dry.
- d. Inject sprayfoam into puncture. Mound sprayfoam to about 1/8 in. (3.2 mm) above surface of unbroken skin. Apply bead of sealant about 1/4 in. (6.4 mm) wide over all cuts in skin leading out from puncture. Do not smooth out sealant.

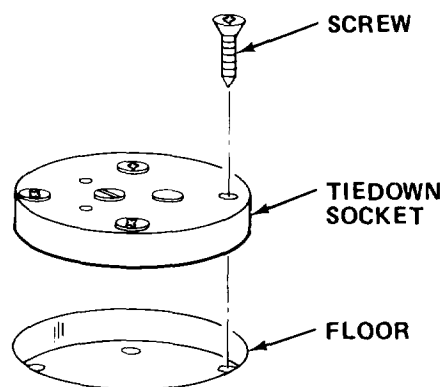
- e. Plan how puncture is to be covered with tape before applying any tape. Length and width of tape, number of tape strips, overlapping, and how tape is applied will affect sealing capability of repair. Each piece of tape should extend about 1-1/2 in. (3.81 cm) beyond sealant it will cover. If this will require more than one strip of tape, tape should overlap about 1/2 in. (12.7 mm). If three or more strips of tape are required, center strip should be applied first.
- f. Holding it taut, apply tape perpendicular to panel skin. Do not apply with rolling motion either end-to-end or center-to-ends. Do not rub each strip in place individually. Apply all strips lightly with proper overlap and rub into place.
- g. If necessary, damaged tape can be replaced; however, it should be removed with careful peeling motion to avoid damage to sealant. If sealant also peels back, new sealant should be applied. Complete removal of old sealant is not necessary. Permanent repair by direct support, or higher category of maintenance, should be made as soon as possible.

#### 1-16.14 Replace Tiedown Socket.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver  
Flat Tip Screwdriver

SUPPLIES: Tiedown Socket



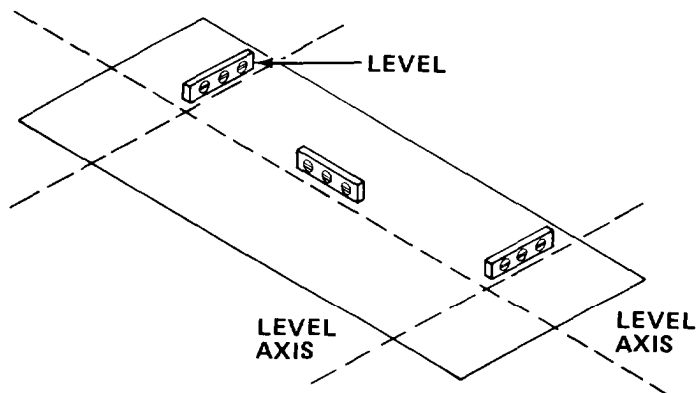
- a. Remove screws from tiedown socket.
- b. Pry defective socket from floor.
- c. Install new tiedown socket. Rotate new tiedown socket enough to avoid installing screws in old screw holes.
- d. Reinstall screws.

1-16.15 Repair Level Indicator.

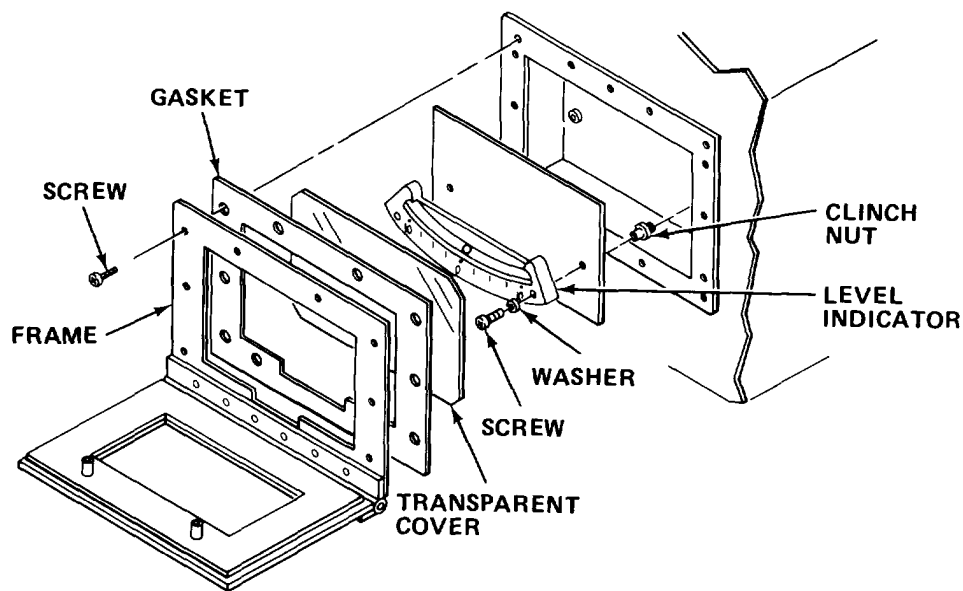
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Carpenter's Level  
Cross Tip Screwdriver  
Knife, TL-29

SUPPLIES: Level Indicator  
Gasket



- a. Level section using level indicators. Then confirm section is level by using carpenter's level on floor inside section.
- b. Adjust section leveling jacks until section is level as indicated by carpenter's alignment level at front-rear and left-right at each end as shown in illustration.



- c. Loosen knurled screws and move cover away from level assembly.

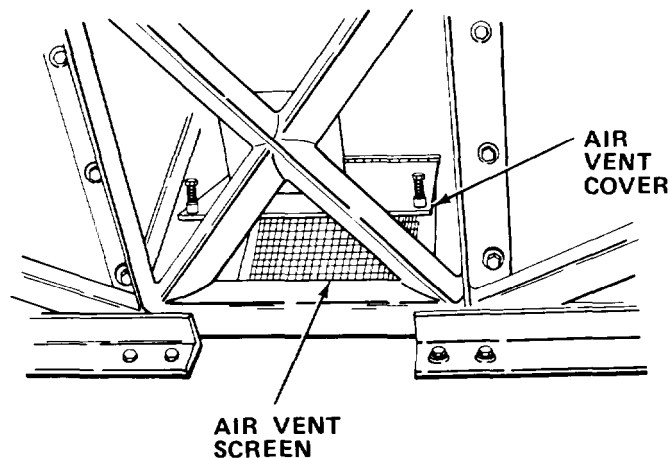
- d. Remove screws and washers to release frame and gasket.
- e. Remove transparent cover.
- f. Remove screws and washers to remove level indicator.
- g. Replace level assembly and secure with screws and washers.
- h. Reinstall transparent cover.
- i. Install new gasket.
- j. Reinstall frame and secure with screws and washers.

#### 1-16.16 Replace Air Vent Screen.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver  
Scissors

SUPPLIES: Rubber Adhesive (Item 1, Appendix E)  
Screen, Nylon (Item 16, Appendix E)



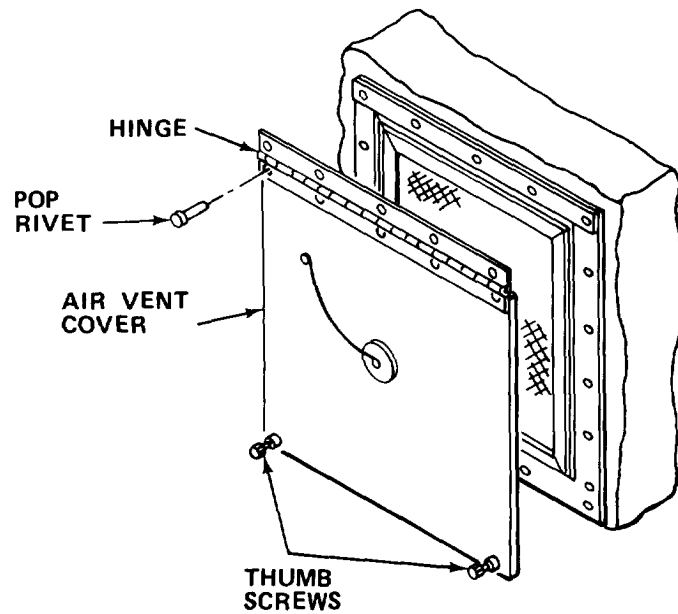
- a. Raise access cover and remove screws holding screen frame to section.
- b. Remove screen and frame.
- c. Clean all old screen material and adhesive from frame.
- d. Cut new screen material to size and attach to frame with adhesive.
- e. Reinstall frame to section and secure with screws. Lower cover.

1-16.17 Replace Air Vent Cover.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Drill and Bits  
Pop Rivet Gun

SUPPLIES: Vent Cover  
Pop Rivets



- a. Loosen thumbscrews.
- b. Drill pop rivets from hinge. Remove air vent cover.
- c. Aline holes and pop rivet new air vent cover to section.
- d. Tighten thumbscrews.

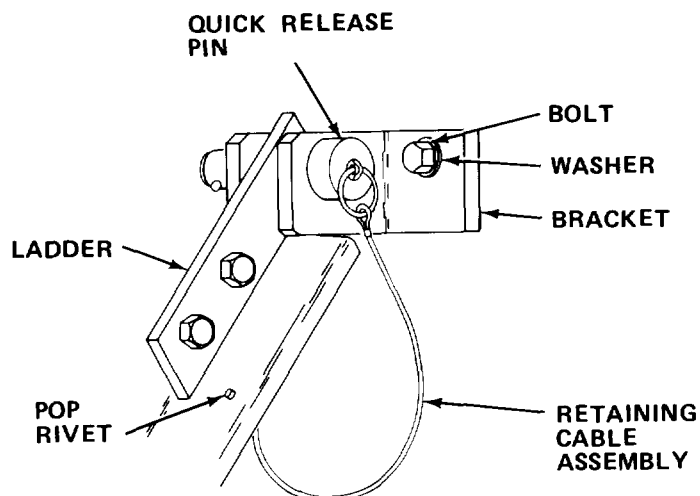
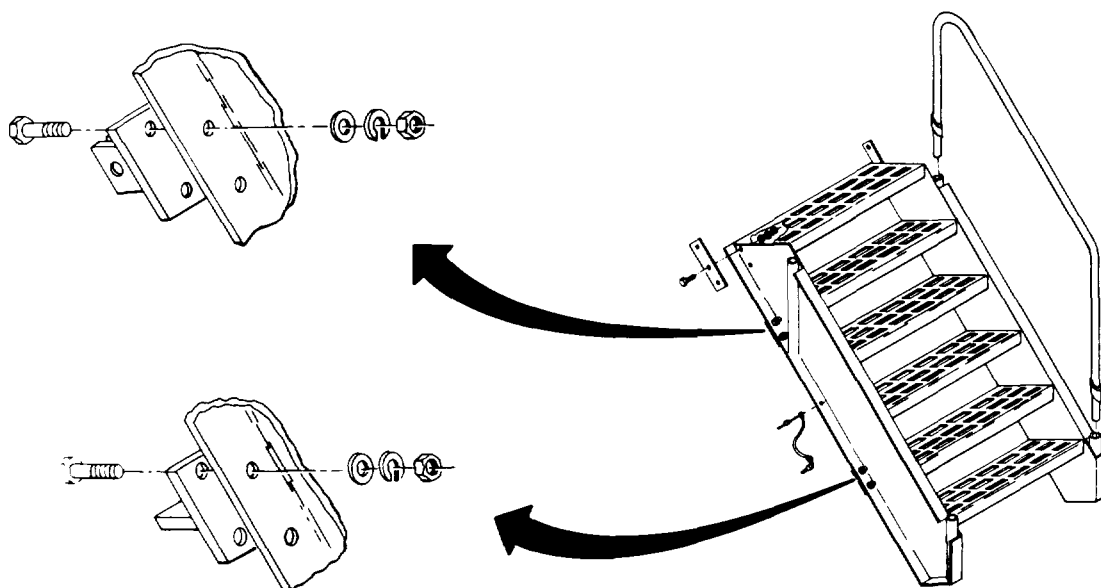


1-16.18 Repair Personnel Ladder.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Drill and Bits  
 Pop Rivet Gun  
 9/16 in. Combination Wrench  
 8 in. Adjustable Wrench

SUPPLIES: Cable Assembly  
 Quick Release Pins  
 Pop Rivets  
 Mounting Brackets



a. Remove ladder from mounting bracket.

- b. Remove bolts, washers, and nuts securing damaged mounting brackets to ladder.
- c. Remove damaged cable assembly from ladder by drilling out rivet.
- d. Reinstall or install new mounting brackets. Secure with bolts, washers, and nuts.
- e. Rivet new cable assembly to ladder.

**NOTE**

Be sure ladder mounting brackets fit section on rear door and under personnel doors.

- f. Reinstall ladder on mounting bracket.

**1-17. PREPARATION FOR STORAGE OR SHIPMENT.**

- a. Section may be stored or shipped either mounted on trailer chassis or unmounted. Preparation of trailer chassis is covered in TM 5-2330-305-14 and should be referred to when trailer-mounted section is prepared for storage and shipment. TM 5-4120-367-14 must be reviewed for instructions covering air conditioner/heater.
- b. Remove consumable supplies that have limited shelf life or broken seals. Replace missing items and be sure that all remaining consumable supplies are at authorized levels. Be sure all major components are operational.
- c. Remove all unauthorized or personal equipment from section.
- d. Move all classified material or sensitive data to proper storage. Complete all accountability and/or transfer of documents.
- e. Refer to Preparation for Movement (paragraph 1-6.2) and follow applicable steps and any additional steps directed by proper authority.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE****1-18. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT**

1-18.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

1-18.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

1-18.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-321-24P covering direct/general support maintenance for this equipment.

1-18.4 Electrical System. Direct/general support level of maintenance for the repair of the section's electrical system will consist of electrical wiring repair using standard electrical wiring repair procedures.

**1-19. DIRECT/GENERAL SUPPORT TROUBLESHOOTING PROCEDURES.**

a. Direct/general support troubleshooting procedures cover the most common malfunctions that may be repaired at the direct/general support level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by lower level maintenance should be conducted in addition to the direct/general support troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

For unidentified malfunctions, use the facing schematic or the foldout located at the end of this manual for further fault analysis.

**Table 1-5. DIRECT/GENERAL SUPPORT TROUBLESHOOTING**

---

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. PERSONNEL/CARGO DOORS DO NOT CLOSE COMPLETELY.
  - Step 1. Check that latch rollers rotate freely.
 

Replace latches (paragraph 1-20.2).
  - Step 2. Check to see if latch rods are bent.
 

Replace latch rods (paragraph 1-20.2).
  - Step 3. Check to see if door gasket is torn or broken.
 

Replace door gasket (paragraph 1-20.3).
  
2. PERSONNEL/CARGO DOORS DO NOT LATCH PROPERLY.
 

Check door latch for missing or damaged components.

Replace door latch (paragraph 1-20.2).
  
3. AIR OR WATER ENTERS SECTION AROUND DOOR.
 

Check to see if door gasket if worn or broken.

Replace door gasket (paragraph 1-20.3).

**Table 1-5. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont**


---

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

4. RECEPTACLES DO NOT OPERATE BUT CIRCUIT BREAKERS ARE ON.

**WARNING**

Turn off main circuit breaker before inspecting or servicing circuit breakers or receptacles. Failure to do so may result in death or serious injury.

- Step 1. Check to see if power cable is firmly connected to power entry panel .

Connect power cable.

- Step 2. Check to see if voltage meter and frequency scale and INCORRECT PHASE or CORRECT PHASE lamp indicate necessary power.

Notify your supervisor for service of power supply at source.

5. CIRCUIT BREAKERS TRIP CONTINUALLY.

**WARNING**

Turn off and padlock safety switch before inspecting or servicing circuit breakers or receptacles. Failure to do so may result in death or serious injury.

- Step 1. Check to see if receptacles are overloaded.

Reconnect equipment to different receptacles.

- Step 2. Check to see if receptacles are damaged.

Replace receptacles (paragraph 1-16.6).

---

**1-20. MAINTENANCE PROCEDURES.**

This section contains instructions covering direct/general support maintenance functions for the Mosaicking/Drafting Section. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

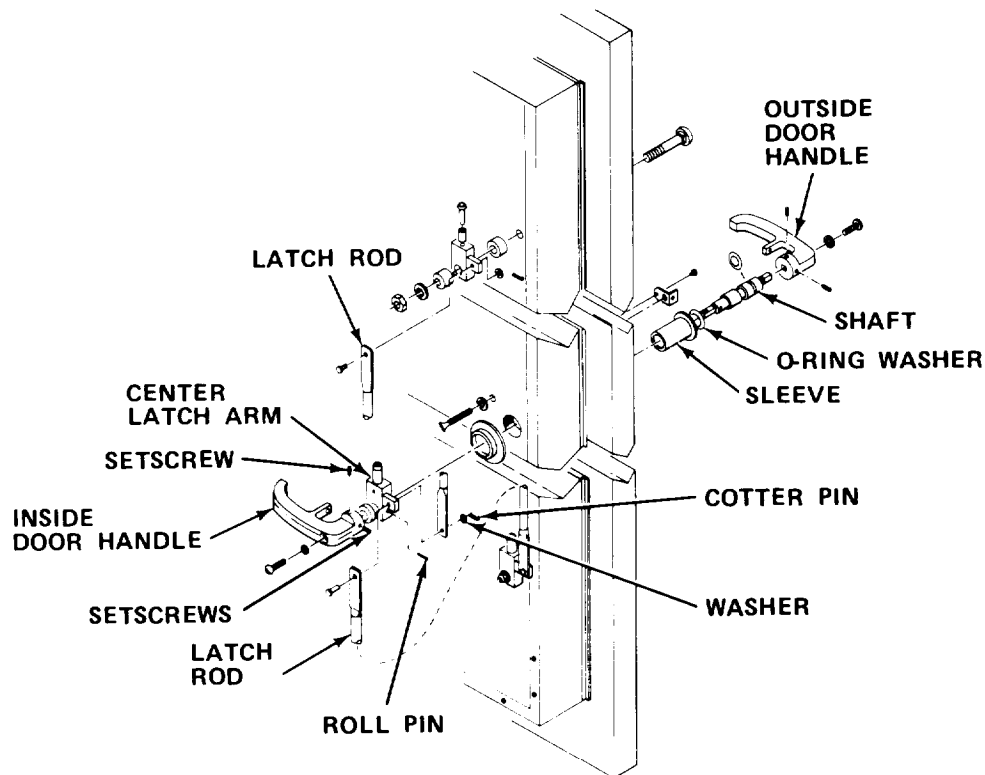
PROCEDURE	PARAGRAPH
Repair Personnel Door Handle. . . . .	1-20.1
Replace Cargo Door Latch Assembly . . . . .	1-20.2
Replace Personnel/Cargo Door Gasket . . . . .	1-20.3
Replace Personnel/Cargo Door . . . . .	1-20.4
Replace Circuit Breaker. . . . .	1-20.5
Repair Floor Covering . . . . .	1-20.6
Repair Van Body Skin (Permanent) . . . . .	1-20.7
Replace Air Conditioner/Heater . . . . .	1-20.8
Replace Air Conditioner Support Bracket . . . . .	1-20.9
Replace Ventilation Duct . . . . .	1-20.10

1-20.1 Repair Personnel Door Handle.

MOS: 63W, Wheel Vehicle Repairer

TOOLS: Cross Tip Screwdriver  
 Needle Nose Pliers  
 15/16 in. Combination Wrench  
 Hammer  
 Center Punch  
 1/8 in. Hex Head Key Wrench

SUPPLIES: O-Ring Washer  
 Sleeve  
 Roll Pin  
 Personnel Door Handle  
 Cheesecloth (Item 5, Appendix E)  
 Oil, Lubricating, General Purpose (Item 11, Appendix E)  
 Hand Oiler  
 Cotter Pin



- a. Loosen screw and socket head setscrews. Remove defective inside door handle.
- b. Remove cotter pin and pins from center latch arm assembly.
- c. Move latch rods out of way.
- d. Punch roll pin from center latch arm assembly and pull latch arm assembly from shaft.
- e. Withdraw latch and defective door handle.
- f. Inspect all components for wear.
- g. Replace worn O-ring washer and sleeve.
- h. Replace other worn components as needed.
- i. Reinstall latch and new door handle.
- j. Aline center latch arm assembly on shaft. Secure with new roll pin.
- k. Aline latch rods. Attach to latch arms with pins, washers, and new cotter pin.

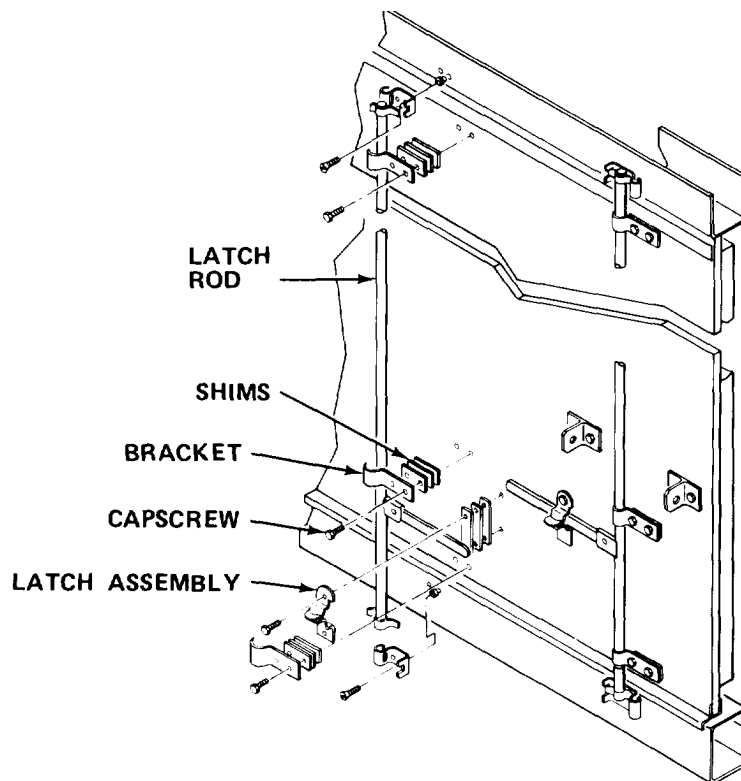
- l. Reinstall new inside door handle.
- m. Lightly oil all moving parts. Wipe up surplus oil.

1-20.2 Replace Cargo Door Latch Assembly.

MOS: 63W, Wheel Vehicle Repairer

TOOLS: 9/16 in. Combination Wrench

SUPPLIES: Cargo Door Latch Assembly



- a. Unlock latch.
- b. Remove capscrews and washers from brackets. Remove brackets and shims.
- c. Remove defective latch assembly and latch rod.
- d. Install new latch assembly and latch rod.
- e. Reinstall shims, brackets, washers, and capscrews.
- f. Check movement of latch rod and latch assembly. Lock latch.

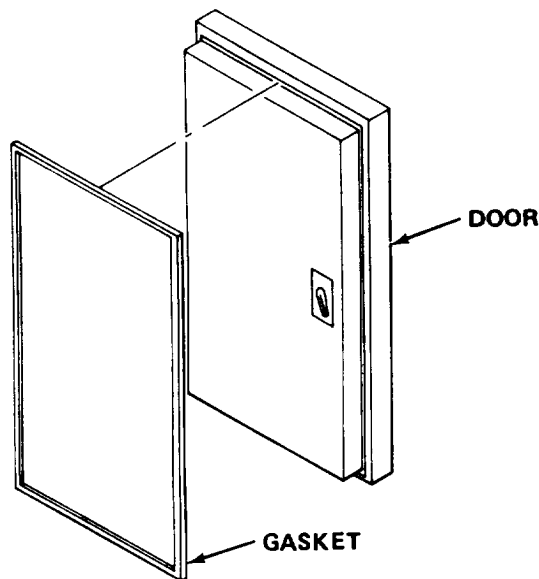


### 1-20.3 Replace Personnel/Cargo Door Gasket.

MOS: 63W, Wheel Vehicle Repairer

TOOLS: Knife

SUPPLIES: Vinyl Gasket  
Adhesive (Item 2, Appendix E)  
Solvent P-D-680 (Item 19, Appendix E)  
Impermeable Gloves  
Goggles



- a. Open door completely and secure in open position.

#### WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent-impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

- b. Remove defective gasket by prying gasket from door. Scrape traces of gasket and adhesive from door. Wash with solvent P-D-680.
- c. Coat gasket area on door with adhesive.
- d. Firmly press new gasket onto door.

- e. Wipe excess adhesive from gasket.
- f. Close door and wipe excess adhesive from door and frame.
- g. Allow adhesive to dry before using door.

1-20.4 Replace Personnel/Cargo Doors.

MOS: 63W, Wheel Vehicle Repairer

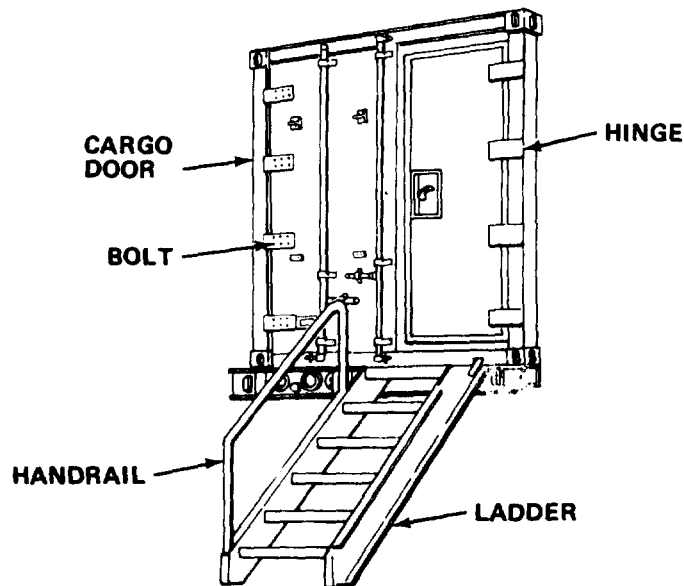
PERSONNEL: Two persons are required to perform this procedure.

TOOLS: Pop Rivet Gun  
Electric Drill and Bits  
Hoist  
3/4 in. Combination Wrench  
Paint Brush

SUPPLIES: Personnel/Cargo Door  
Pop Rivets  
Vinyl Gasket  
paint (Items 12, 12A and 12B Appendix E)  
Paint (Item 13, Appendix E)  
Adhesive (Item 2, Appendix E)  
Cheesecloth (Item 5, Appendix E)

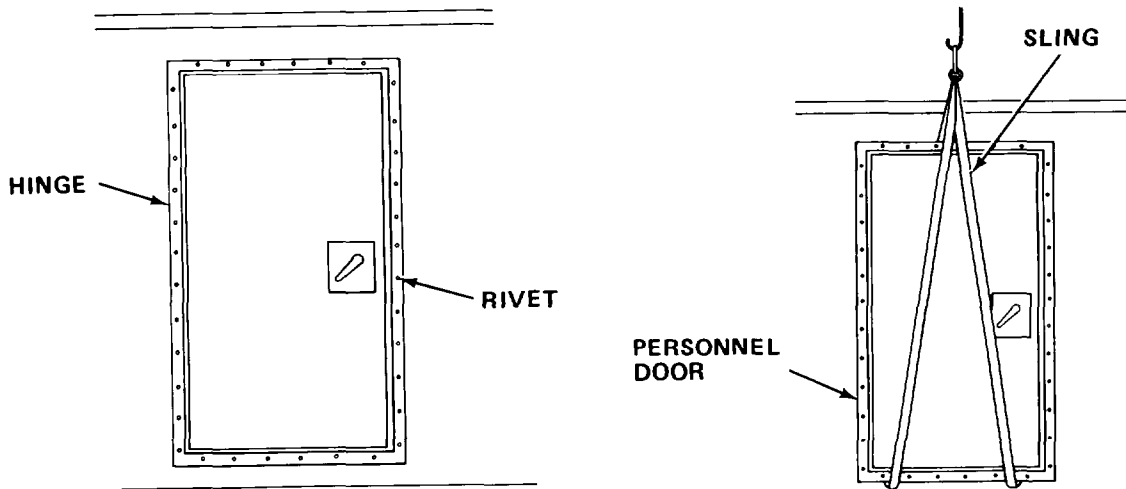
**WARNING**

To prevent personal injury or equipment damage, do not attempt to remove doors unless suitable lifting equipment and hoist are available.



- a. Remove handrails and ladders if rear cargo door is to be replaced.

- b. Unlock and open door to be replaced.



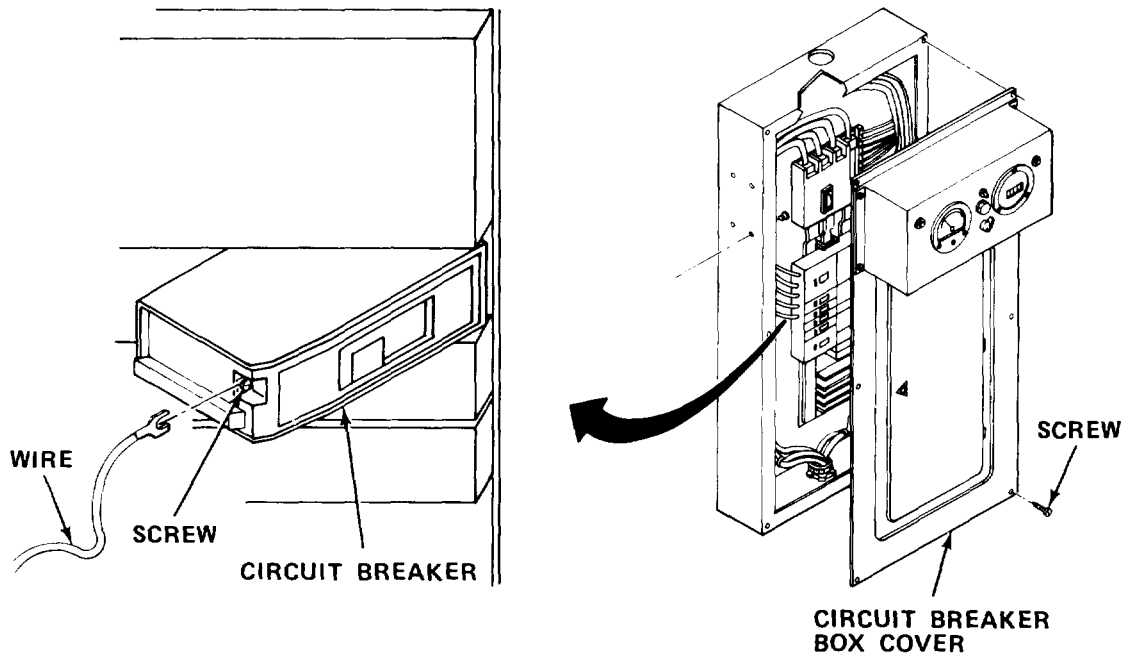
- c. Place sling around door and put a slight strain on hoist to remove weight from hinges.
- d. Remove bolts from hinges *on* rear personnel door. On side personnel door, drill out pop rivets from hinge. Remove hinges from door.
- e. Remove damaged door using hoist.
- f. Install new door using hoist.
- g. Reinstall hinges on rear personnel door. Secure with bolts. Reinstall hinges on side personnel door. Secure with pop rivets.
- h. Remove sling from door.
- i. Install new gaskets on door after it is mounted (paragraph 1-20.3).
- j. Repaint as needed.
- k. Close and lock door.

1-20.5 Replace Circuit Breaker.

MOS: 35E, Special Electronic Devices Repairer

TOOLS: Flat Tip Screwdriver  
Multimeter

SUPPLIES: Circuit Breaker



**WARNING**

Turn off and padlock safety switch. Turn off all individual circuit breakers before inspecting or servicing circuit breakers. Failure to do so may result in death or serious injury.

- a. Turn off and padlock safety switch. Turn off individual circuit breakers.
- b. Remove circuit breaker box cover.
- c. Use multimeter to make sure voltage is not present.
- d. Remove defective circuit breaker by pushing and snapping out of place.
- e. Tag and remove wires from defective circuit breaker.
- f. Pull circuit breaker from panel.
- g. Reconnect wires to new circuit breaker. Secure wires with screws.

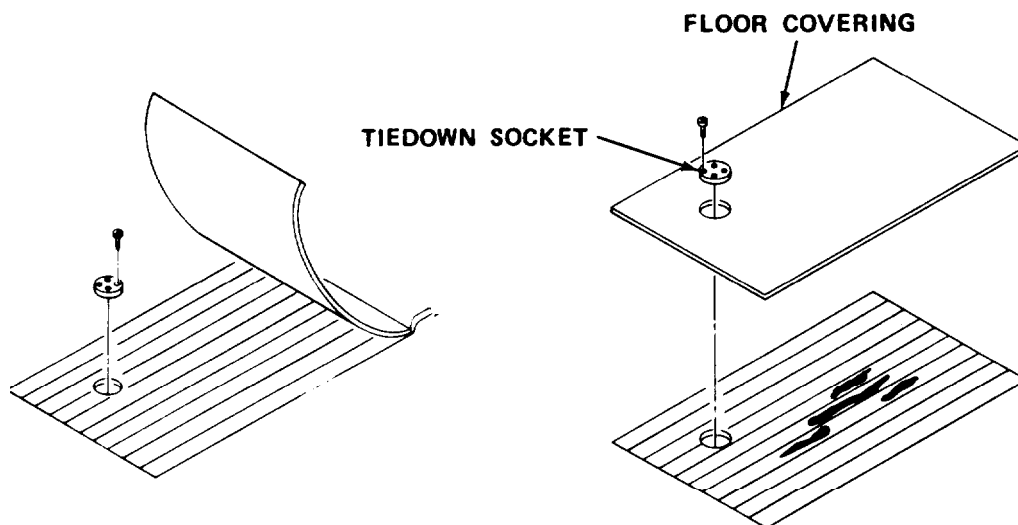
- h. Install new circuit breaker by pushing and snapping into place.
- i. Reinstall circuit breaker box cover.
- j. Remove padlock and turn on safety switch and individual circuit breakers.

#### 1-20.6 Repair Floor Covering.

MOS: 52C, Utilities Equipment Repairer

TOOLS: Utility Knife  
 Cross Tip Screwdriver  
 Scraper  
 Straightedge

SUPPLIES: Vinyl Floor Covering  
 Epoxy Resin (Item 15, Appendix E)  
 Floor Patch (Item 8, Appendix E)  
 Cheesecloth (Item 5, Appendix E)  
 Adhesive (Item 1, Appendix E)



- a. Cut a rectangular area from damaged floor covering.
- b. Remove tiedown socket. Remove damaged floor covering.
- c. Cut new floor covering to fit. Apply adhesive to floor. press down new floor covering.
- d. Reinstall tiedown socket.

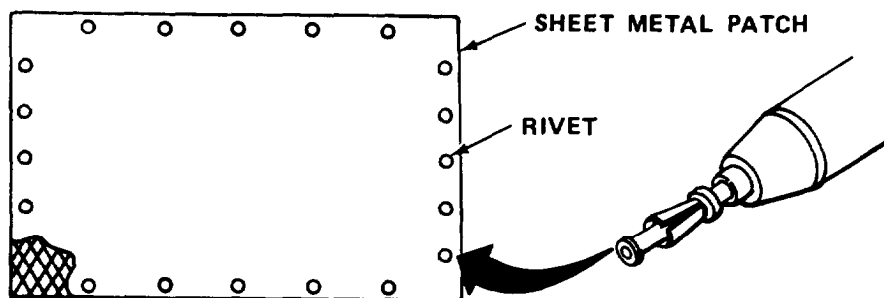
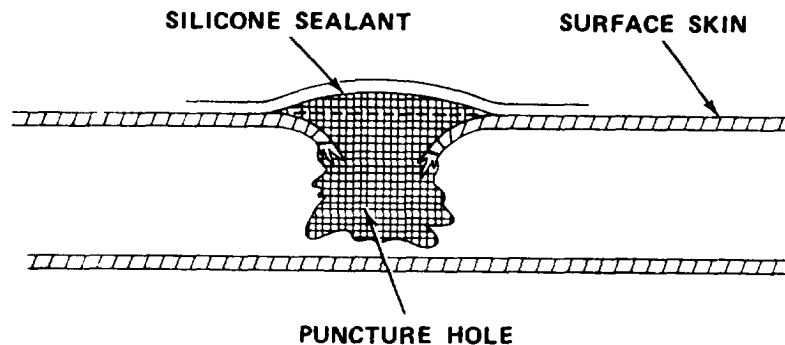
1-20.7 Repair Van Body skin (Permanent).

MOS: 63W, Wheel Vehicle Repairer

TOOLS: Pop Rivet Gun  
Electric Drill and Bits  
Paint Brush

SUPPLIES: Pop Rivets  
Sprayfoam (Item 21, Appendix E)  
Silicone Sealant (Item 17, Appendix E)  
Sheet Metal  
Paint (Items 12, 12A and 12B Appendix E)  
Cheesecloth (Item 5, Appendix E)

- a. Bend broken edges of skin inward into puncture hole. Do not attempt to remove fragments of skin by bending or pulling out.
- b. Remove any loose fragments of foam.
- c. Use cloth dampened with water to clean area around puncture. Wipe dry.
- d. Inject sprayfoam into puncture. Fill to 1/8 in. (3.2mm) above surface of unbroken skin. Apply sealant to cracks leading to puncture.



- e. Prepare sheet metal patch large enough to cover damaged area with overlap.
- f. Place patch over damaged area and mark all around edges of patch.
- g. Drill holes 1 in. (25.4 mm) apart.

- h. Apply sealant to edges of patch.
- i. Apply patch to van body.
- j. Install pop rivets beginning at center of each side. Rivets should be placed 1 in. (25.4 mm) apart.
- k. Paint as needed.

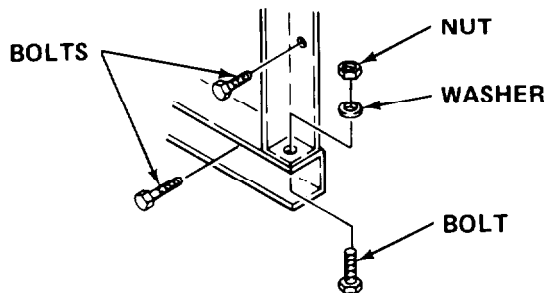
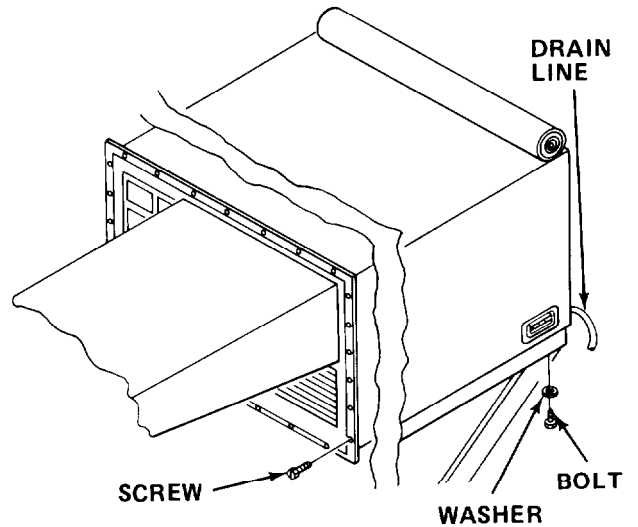
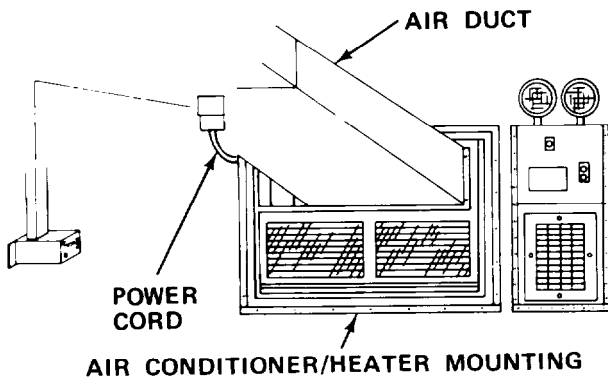
1-20.8 Replace Air Conditioner/Heater

MOS: 63W, Wheel Vehicle Repairer

PERSONNEL: Two persons are required to perform this procedure.

TOOLS: Cross Tip Screwdriver  
Lifting Equipment  
8 in. Adjustable Wrench  
7/16 in. Combination Wrench

SUPPLIES: Air Conditioner/Heater  
Solvent P-D-680 (Item 19, Appendix E)  
Gasket  
Sealant (Item 17, Appendix E)  
Adhesive (Item 2, Appendix E)



**WARNING**

Use hoist or proper lifting equipment to replace air conditioner/heater. Failure to do so may result in death or serious injury.

Turn off air conditioner/heater circuit breaker and unplug power cord. Failure to do so may result in death or serious injury.

- a. Turn off air conditioner/heater circuit breaker. Unplug or disconnect power cord as appropriate.
- b. Remove screws holding air duct to air conditioner/heater.
- c. Remove nut, washer, and screw from each corner of air conditioner/heater mounting. Remove screws securing mounting to section.
- d. Disconnect drain line from air conditioner/heater.
- e. Attach sling to lifting handles. Raise hoist enough to remove slack from sling.
- f. Remove mounting bolts and washers.
- g. Slide out air conditioner until other lifting handles are free. Attach sling to handles.
- h. Raise defective air conditioner/heater with hoist until unit is free from brackets and section.
- i. Place air conditioner/heater on flat-bed truck or pallet.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Wear solvent-impermeable gloves and eye/face protective equipment when using solvent. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

- j. Clean sealant from opening using dry cleaning solvent P-D-680.
- k. Remove damaged gasket and replace with new gasket.
- l. Raise air conditioner/heater until it rests on air conditioner/heater brackets.
- m. Remove two sling hooks as unit is eased into hole until grille touches duct.
- n. Remove remaining sling.



- o. Reinstall washers and mounting bolts.
- p. Reconnect drain lines.
- q. Reinstall screws securing air conditioner/heater mounting to section wall. Reinstall screw, washer, and nut to each corner of mounting.
- r. Reinstall screws securing air duct to air conditioner/heater.
- s. Reconnect or plug in power cord. Turn on air conditioner/heater circuit breaker.

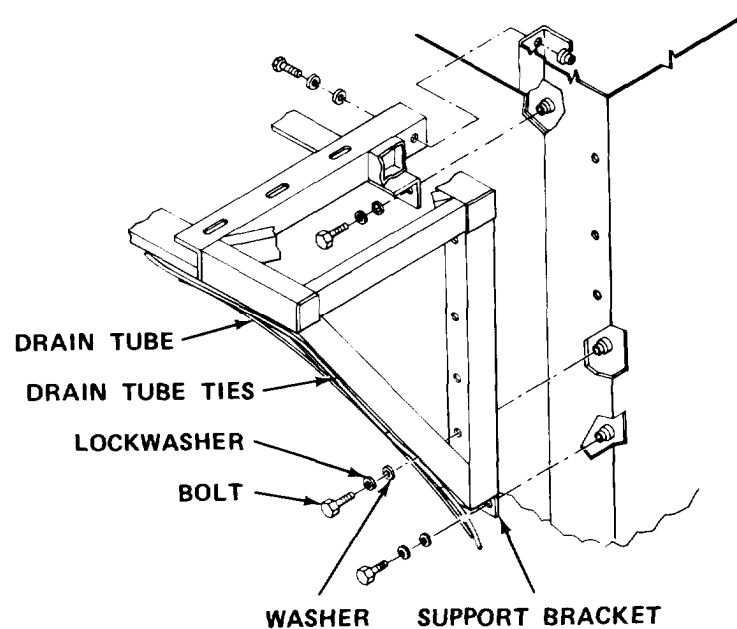
1-20.9 Replace Air Conditioner Support Bracket.

MOS: 63W, Wheel Vehicle Repairer

PERSONNEL: Two persons are required to perform this procedure.

TOOLS: 9/16 in. Combination Wrench  
Lifting Equipment  
Knife, TL-29

SUPPLIES: Air Conditioner Support Bracket  
Drain Tube Ties



**WARNING**

Serious injury to personnel or damage to equipment may occur unless two or more personnel are used to remove and replace air conditioner/heater because of weight and balance of air conditioner/heater.

- a. Remove air conditioner/heater (paragraph 1-20.8).
- b. Cut drain tube ties, and remove drain tube from support bracket.
- c. Remove bolts, lockwashers, and washers securing support bracket.
- d. Remove defective support bracket.
- e. Install new support bracket. Secure to section with bolts, lockwashers, and washers.
- f. Reinstall drain tube on support bracket, and secure with new ties.
- g. Reinstall air conditioner/heater (paragraph 1-20.8).

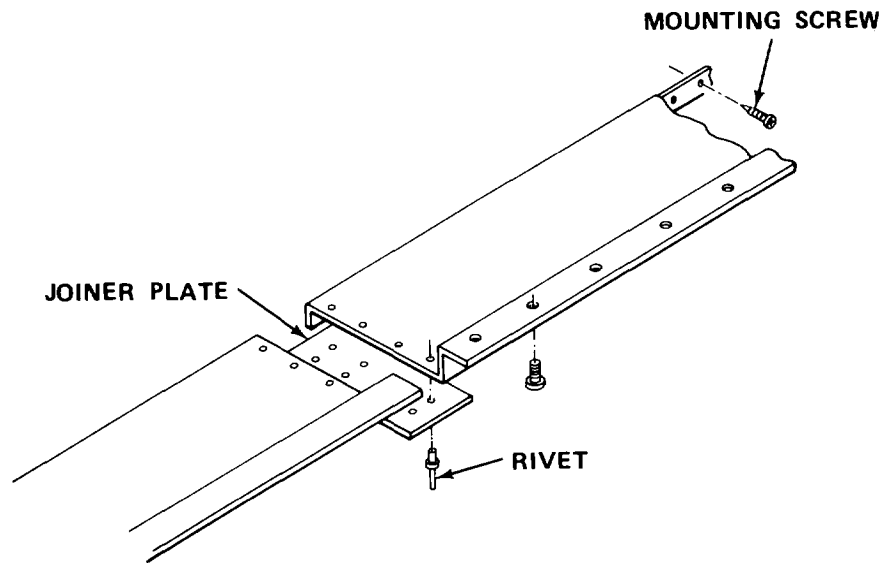
1-20.10 Replace Ventilation Duct.

MOS: 52C, Utilities Equipment Repairer

TOOLS: Hacksaw  
Electric Drill and Bits  
Ball Peen Hammer  
Pop Rivet Gun  
Paint Brush  
Cross Tip Screwdriver

SUPPLIES: Sealant (Item 17, Appendix E)  
Wood Block  
Pop Rivets  
Paint (Item 13, Appendix E)  
Cheesecloth (Item 5, Appendix E)  
Salvaged Ventilation Duct

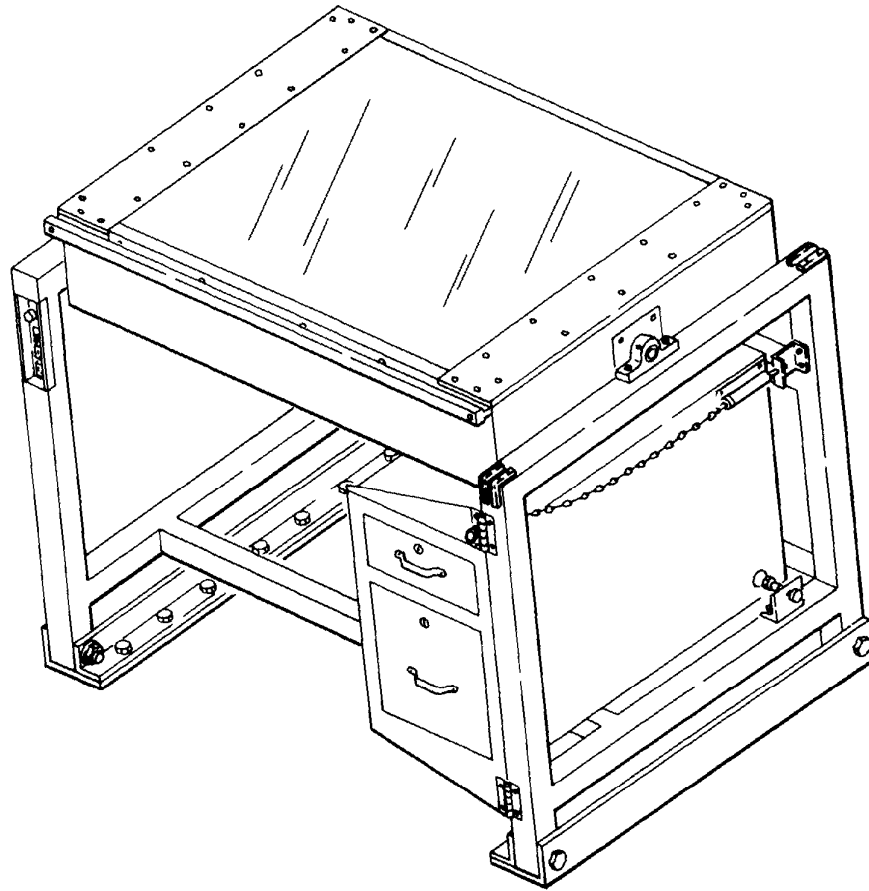
- a. Turn off air conditioner/heater so air will not blow through duct.



- b. Drill rivets from damaged section of duct. Remove joiner plates.
- c. Remove mounting screws to remove damaged sections of duct.
- d. Straighten remaining sections of duct at edges using hammer and wood block.
- e. Place sealant on mounting edges.
- f. Install new duct section cut from salvaged duct. Secure with screws.
- g. Reinstall joiner plates. Install rivets to secure.
- h. Paint as necessary.
- i. Turn on air conditioner/heater.







## CHAPTER 2

## DRAFTING, SCRIBING/TRACING TABLE

## Section I INTRODUCTION

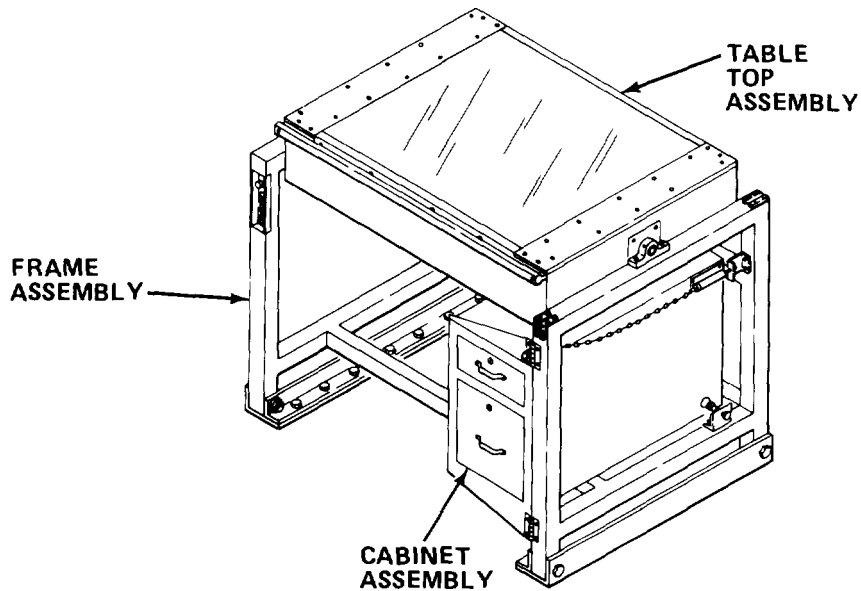
**2-1. GENERAL INFORMATION.**2-1.1 Scope.

- a. Model Number and Equipment Name. Model 99-9933 Drafting, Scribing/Tracing Table.
- b. Purpose of Equipment. To provide user with drafting, scribing, or tracing table in compact unit.

**2-2. EQUIPMENT DESCRIPTION.**2-2.1 Equipment Characteristics, Capabilities, and Features.

- a. Rapid work surface selection.
- b. Auxiliary electrical outlets.
- c. Two drawer storage.
- d. Tilting work surface (0, 5, and 10 degrees).
- e. Easy access to all controls.
- f. Diffused light source.
- g. Drawing guard on front edge of drafting, scribing/tracing table.
- h. Sturdy steel base.

2-2.2 Location and Description of Major Components.



FRAME ASSEMBLY. Supports table top assembly, drawer assembly, control panel, safety stops, and tilt lock.

TABLE TOP ASSEMBLY. Consists of drafting board, light board, diffused lighting, and drawing guard.

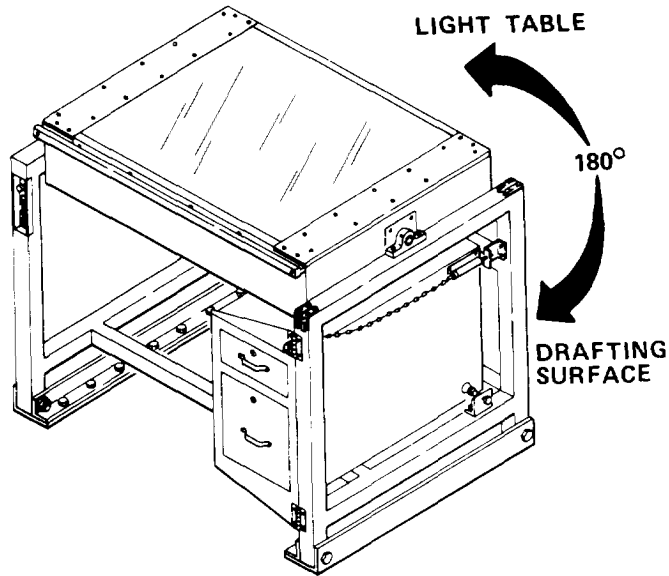
CABINET ASSEMBLY. Consists of two drawers and drawer lock module.

2-2.3 Equipment Data.

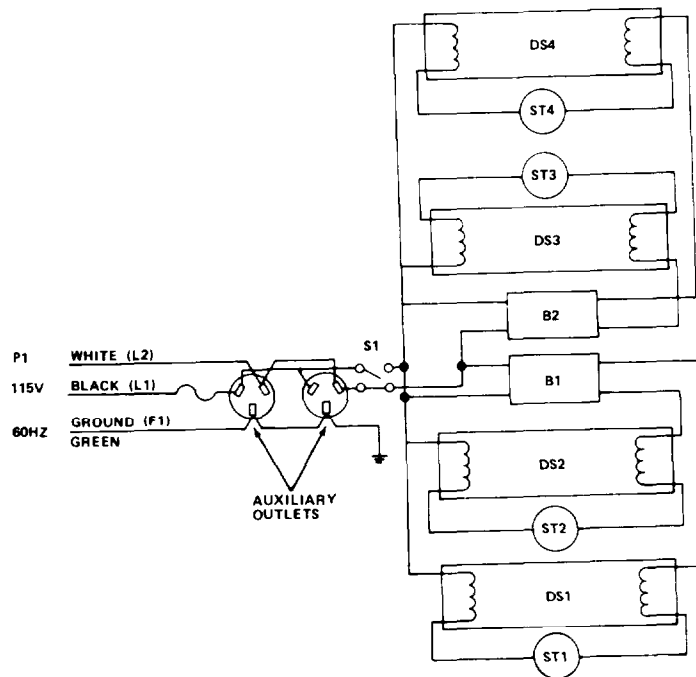
Power Requirements	115 V, 60 Hz, single-phase
Drafting Surface	42 in. X 31 in. (106.7 cm X 78.7 cm)
Light Table Surface	30 in. X 30 in. (76.2 cm X 76.2 cm)
Dimensions	
Width	47 in. (119.4 cm)
Depth	34 in. (86.4 cm)
Height (Table Flat)	42 in. (106.7 cm)



2-3. TECHNICAL PRINCIPLES OF OPERATION.



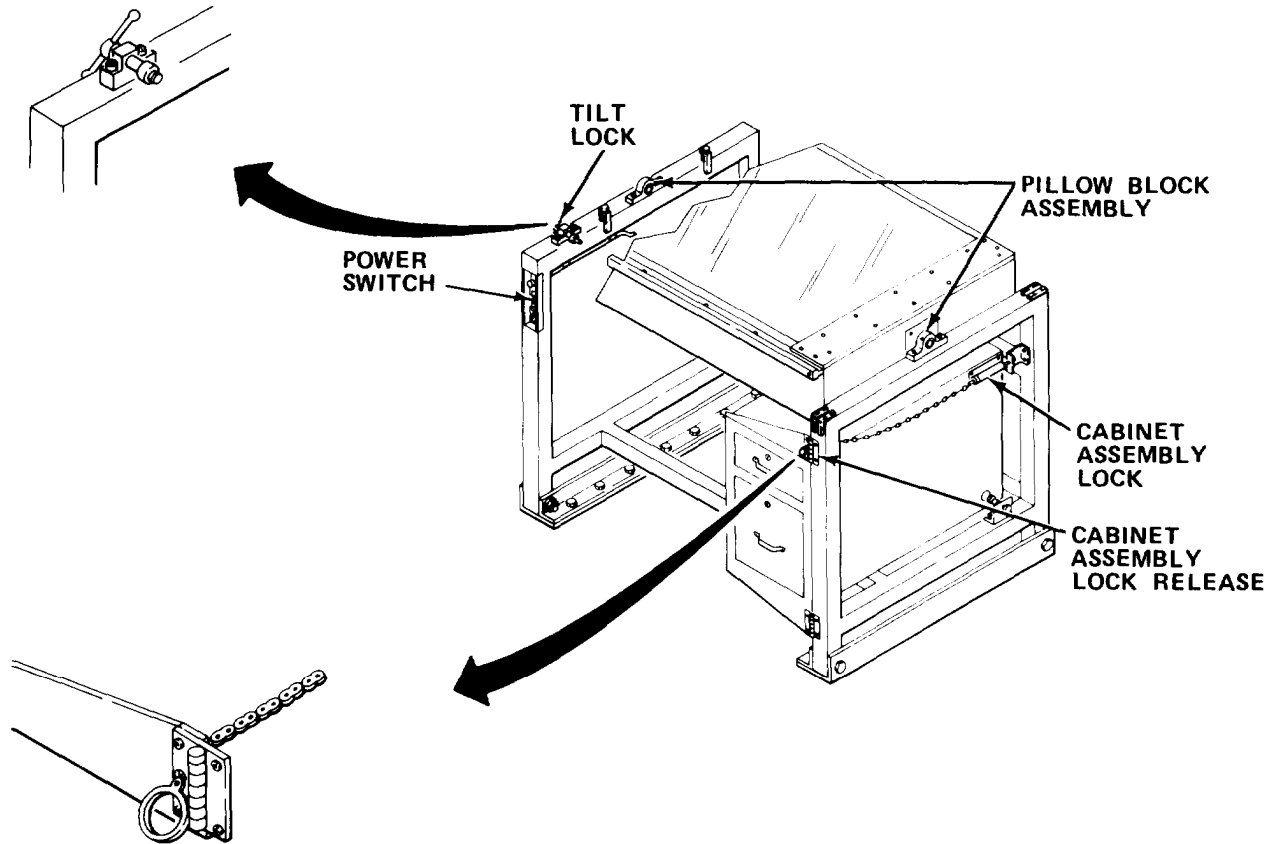
2-3.1 General. The movable top permits selection of drafting surface or light table. Safety stops so that table top will turn only 180 degrees to prevent damage to electrical wiring. For drafting surface, rotate top away from operator. For light table, rotate top toward operator.



2-3.2 Electrical System. Provides power to the light table and two auxiliary outlets. The auxiliary outlets are located on the control panel. When plug P1 is connected, 120 V ac is applied to auxiliary even if power switch S1 is off.

Section II OPERATING INSTRUCTIONS

2-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Control or Indicator	Function
Tilt Lock	Used to change angle of work surface or to change work surface. Loosen tilt lock to change work surface. Tighten to secure in position.
Pillow Block Assembly	Houses the bearing which allows easy rotation of the work surface.

Control or Indicator	Function
Cabinet Assembly Lock and Cabinet Assembly Lock Release	Located at upper cabinet assembly hinge on right front table leg. To open cabinet assembly, pull cabinet assembly lock release and swing assembly out, so it is not under table.
Power Switch	Provides power to light table lamps only.

## 2-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

### 2-5.1 PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

g. Interval columns. This column determines the time period designated to perform your PMCS.

h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Liquid Detergent (Item 7, Appendix E)	ar
Cheesecloth (Item 5, Appendix E)	ar

**Table 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

**NOTE**

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D During  
A After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

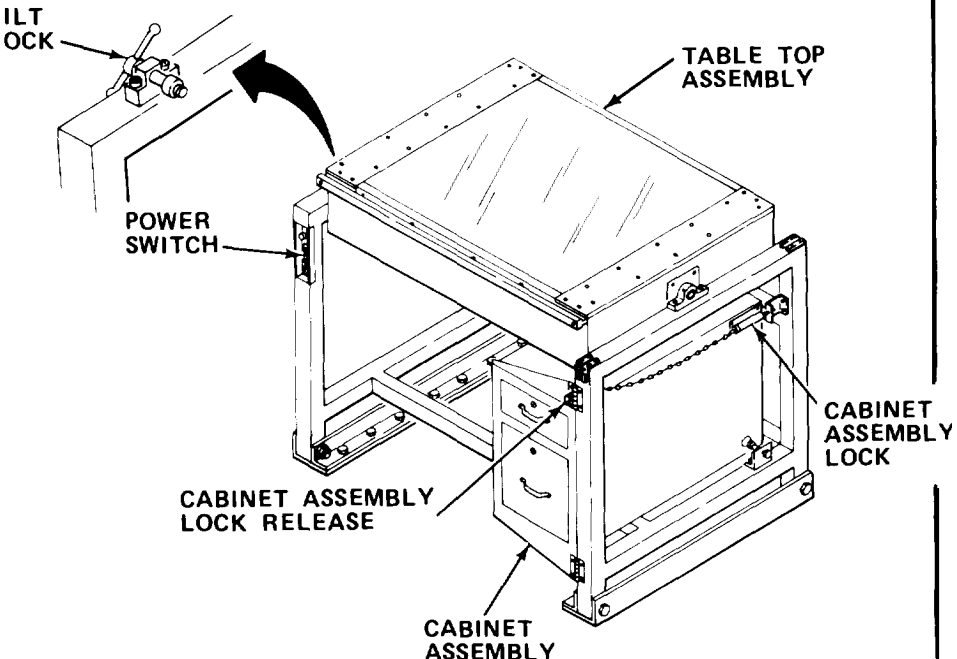
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B/A	<p><b><u>DRAFTING, SCRIBING/TRACING TABLE</u></b></p> <p><u>Inspect.</u></p> <p>1. Glass table surface.</p>  <p>2. Turn power switch OFF.</p>	Glass cracked or broken.

Table 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B/A	<u>DRAFTING, SCRIBING/TRACING TABLE - Cont</u>	
		<p><u>Inspect - Cont</u></p> <ol style="list-style-type: none"> <li>3. Pull cabinet assembly lock release ring and swing out cabinet assembly.</li> <li>4. Loosen tilt lock until it clears table top assembly.</li> <li>5. Rotate table top 180°</li> <li>6. Tighten tilt lock to secure table top assembly in position.</li> <li>7. Inspect wooden table top.</li> <li>8. Rotate table top 180° and tighten tilt lock</li> <li>9. Return cabinet assembly to its normal position under table.</li> <li>10. Press firmly on cabinet assembly front until cabinet assembly lock clicks.</li> <li>11. Turn power switch ON. Be sure all table lights are on. Check surface for cracks or breaks.</li> <li>12. Turn power switch OFF.</li> </ol>	

Table 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
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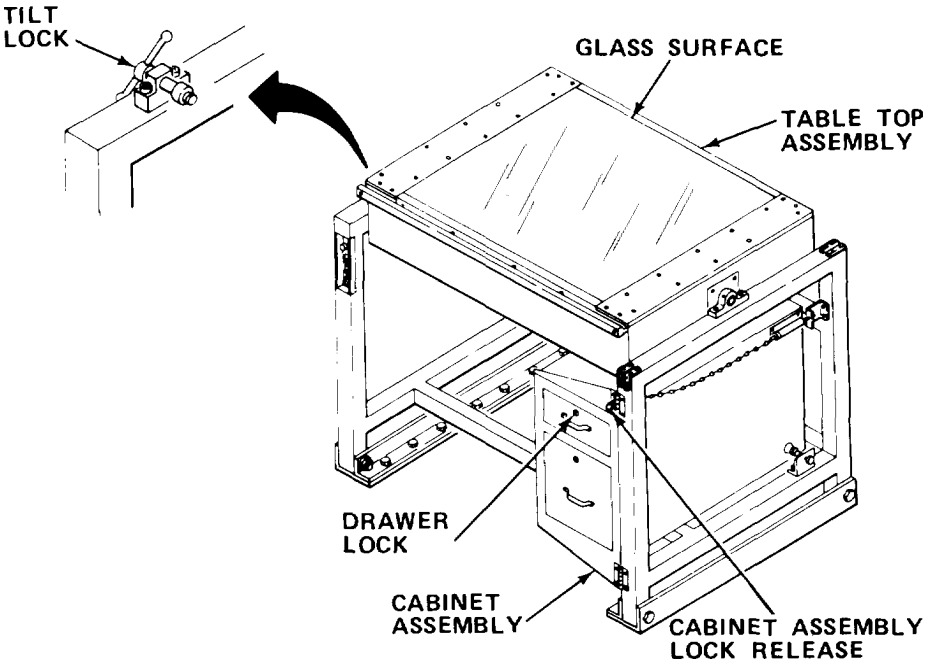
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	B	<p><b>DRAFTING, SCRIBING/TRACING TABLE - Cont</b></p> <p>Service.</p>  <p style="text-align: center;"><b>WARNING</b></p> <p>Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.</p> <ol style="list-style-type: none"> <li>1. Unplug power cord.</li> <li>2. Pull cabinet assembly lock release ring and swing out cabinet assembly.</li> <li>3. Loosen tilt lock until it clears table top assembly.</li> </ol>	

Table 2-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	B	<b><u>DRAFTING, SCRIBING/TRACING TABLE - Cont</u></b>	Table top does not rotate.
		<p><u>Service - Cont</u></p> <ol style="list-style-type: none"> <li>4. Rotate table top assembly until glass surface is on top.</li> <li>5. Tighten tilt lock to secure table top assembly in position.</li> </ol> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Do not use abrasive cleaner on glass surface. Do not use running water or excessive water on cloth. Use moist cloth. Abrasive cleaner will scratch glass surface. Excessive water can cause equipment damage.</p> <ol style="list-style-type: none"> <li>6. Wipe glass surface with cheesecloth moistened in mild solution of detergent and water.</li> <li>7. Wipe glass surface with dry cheesecloth to remove streaks and smears.</li> <li>8. Swing cabinet assembly to its normal position under table.</li> <li>9. Plug in power cord.</li> </ol>	



**2-6. OPERATION UNDER USUAL CONDITIONS.****2-6.1 Assembly and Preparation for Use.**

- a. Clean work surface.
- b. Plug power cord into electrical receptacle.
- c. Turn power switch on for light table use.

**2-6.2 Operating Procedures.**

- a. Changing Work Surface.

**CAUTION**

Safety stops have been included to prevent overtravel of table top and damage to electrical wiring. If drafting surface is in top position, swing front edge of table top down to change work surface. If light table is in top position, swing front edge up to change work surface. Table cannot be rotated until cabinet assembly is swung out.

- (1) pull cabinet assembly lock release ring and swing out cabinet assembly.
- (2) Loosen tilt lock until it clears table top assembly.
- (3) Tighten tilt lock to secure table top assembly in position.
- (4) Return cabinet assembly to its normal position under table top assembly.
- (5) Press firmly on cabinet assembly front until cabinet assembly lock clicks.

**2-6.3 Preparation for Movement.**

- a. Turn off power.
- b. Unplug power cord. Coil power cord and tape to table.
- c. Rotate table top assembly, if necessary, to be sure glass surface faces upward.
- d. Tighten tilt lock to secure table top assembly.
- e. Press firmly on cabinet assembly front until cabinet assembly lock clicks.
- f. Check cabinet drawers for open containers and loose items. Seal containers and secure all loose items.
- g. Lock cabinet drawers.

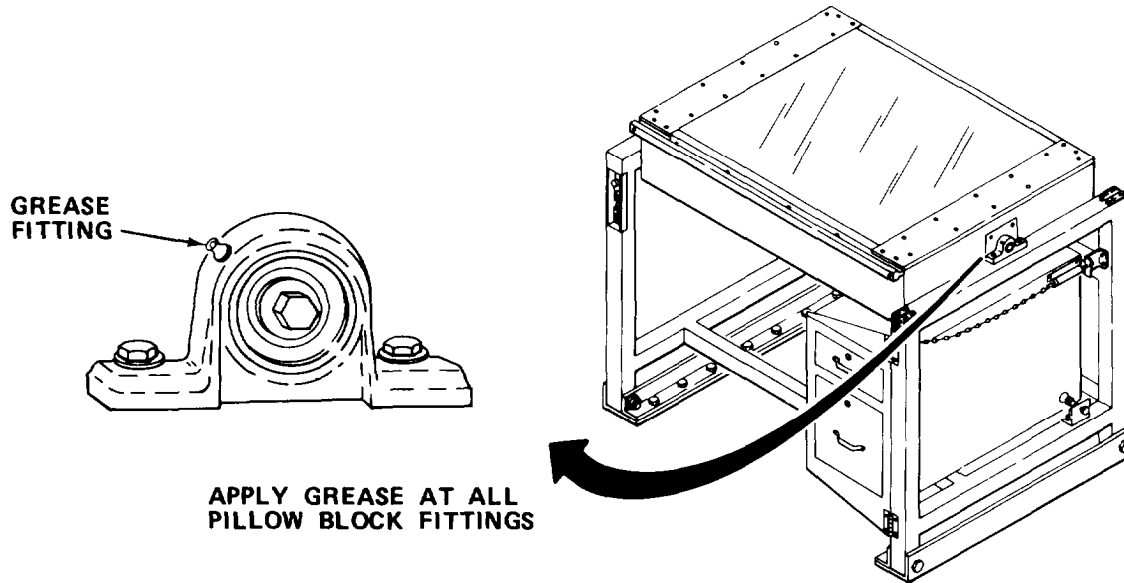
**2-7. OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.

### Section III OPERATOR MAINTENANCE

#### 2-8. LUBRICATION INSTRUCTIONS.

##### NOTE

These lubrication instructions are mandatory.



2-8.1 Pillow Block Fittings. Apply ball and roller bearing grease (Item 9, Appendix E) to both pillow blocks annually.

- a. Apply grease sparingly using grease gun.
- b. Wipe grease fittings clean after application.

#### 2-9. TROUBLESHOOTING PROCEDURES.

a. The table lists the common malfunctions which you may find during operation or maintenance of the drafting, scribing/tracing table, or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

Table 2-2. TROUBLESHOOTING.

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. LAMPS DO NOT LIGHT.	Step 1. Check that power switch is ON.	(a) If power switch is ON, proceed to step 2. (b) Turn on power switch.
	step 2. Check that power cord is plugged in.	(a) If power cord is plugged in, proceed to step 3. (b) Plug in power cord.
	Step 3. Visually check fuse for broken filament.	(a) Replace fuse (paragraphs 2-10.1) (b) If filament is not broken, refer to organizational maintenance.
2. TABLE DOES NOT LOCK.	Check for loose tilt lock.	(a) If loose, tighten. (b) If tight, refer to organizational maintenance.

**2-10. MAINTENANCE PROCEDURES.**

This section contains instructions covering operator/crew maintenance functions for the drafting, scribing/tracing table. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

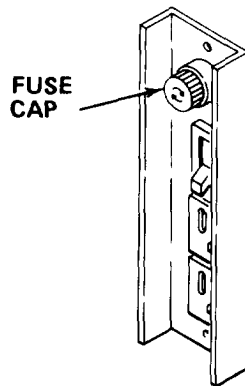
INDEX

PROCEDURE	PARAGRAPH
Replace Fuse . . . . .	2-10.1

2-10.1 Replace Fuse.

MOS: 81C, Cartographer

SUPPLIES: Fuse (5 AMP)



a. Turn power switch OFF.

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- b. Unplug power cord.
- c. Push in on cap and turn left.
- d. Remove defective fuse.
- e. Install new fuse, push in , and turn right.
- f. Plug in power cord.

## Section IV ORGANIZATIONAL MAINTENANCE

### 2-11. LUBRICATION INSTRUCTIONS.

2-11.1 Pillow Block Fittings. After replacement, apply ball and roller bearing grease (Item 9, Appendix E) to pillow blocks.

- a. Apply grease sparingly using grease gun.
- b. Wipe grease fittings clean after application.

### 2-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT(TMDE); AND SUPPORT EQUIPMENT.

2-12.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to Your unit.

2-12.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

2-12.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-321-24P covering organizational maintenance for this equipment.

**2-13. SERVICE UPON RECEIPT.** The drafting, scribing/tracing table may be received mounted in the section or in a shipping crate-.

#### 2-13.1 Checking Unpacked Equipment.

- a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.
- b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.
- c. Check to see whether the equipment has been modified.

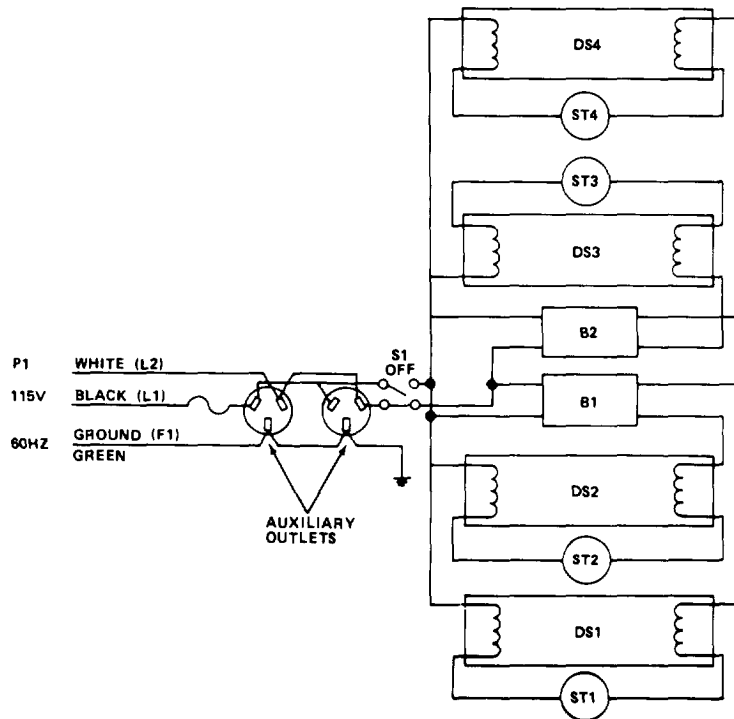
**2-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

**2-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.**

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the following schematic or foldout located at the end of this manual for further fault analysis.



d. If the drafting, scribing/tracing table does not power-up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power procedures for dead receptacle (Table 1-4).

**Table 2-3. ORGANIZATIONAL TROUBLESHOOTING**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. LAMPS DO NOT LIGHT.	Step 1. Check continuity of power switch.	(a) If continuity exists, proceed to step 2. (b) If no continuity exists, replace power switch (paragraph 2-16.1).
	Step 2. Check continuity of power cord.	(a) If no continuity exists, replace power cord (paragraph 2-16.2). (b) If continuity exists, replace tube starter (paragraph 2-16.5). (c) If lamps still do not light, replace ballast (paragraph 2-16.4).
2. POWER RECEPTACLES DO NOT WORK.	Step 1. Check continuity of power cord.	(a) If continuity exists, proceed to step 2. (b) If no continuity exists, replace power cord (paragraph 2-16.2).
	Step 2. Check continuity of receptacle.	Repair receptacle (paragraph 2-16.3).
3. TABLE DOES NOT LOCK.	Step 1. Check for loose tilt lock.	(a) If tight, proceed to step 2. (b) Tighten tilt lock.

**Table 2-3. ORGANIZATIONAL TROUBLESHOOTING - Cont**

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

3. TABLE DOES NOT LOCK - Cont

Step 2. Check for defective tilt lock.

- (a) If good, proceed to step 3.
- (b) If defective, replace (paragraph 2-16.6).

Step 3. Check for loose tilt locking block.

- (a) If tight, proceed to step 4.
- (b) If loose, tighten.

Step 4. Check for defective tilt locking block.

- (a) If good, proceed to step 5.
- (b) If defective, replace (paragraph 2-16.6).

Step 5. Check for defective tilt lock plate.

If defective, replace (paragraph 2-16.6).

---



**2-16. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering organizational maintenance functions for the drafting, scribing/tracing table. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURES	PARAGRAPH
Replace Power Switch . . . . .	2-16.1
Replace Power Cord . . . . .	2-16.2
Replace Receptacle . . . . .	2-16.3
Replace Lamp Ballast . . . . .	2-16.4
Replace Lamp/Starter . . . . .	2-16.5
Repair Tilt Lock . . . . .	2-16.6
Replace Pillow Block Assembly . . . . .	2-16.7
Remove/Install Drafting, Scribing/Tracing Table . . . . .	2-16.8

2-16.1 Replace Power Switch.

MOS: 83FJ6, Reproduction Equipment Repairer

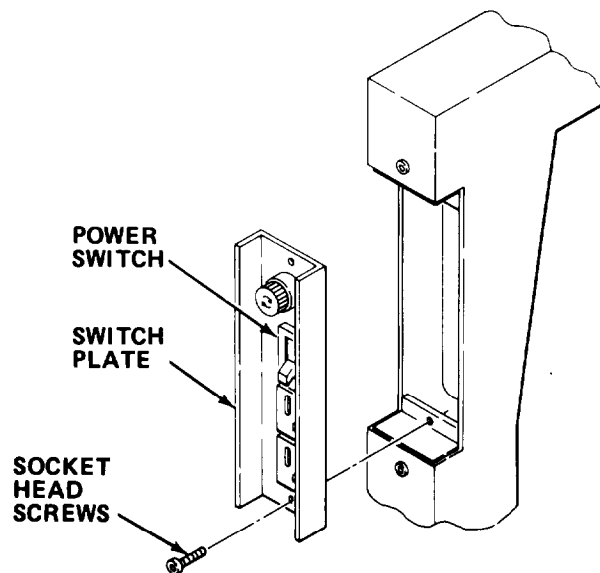
TOOLS: 5/64 in. Hex Head Key Wrench

SUPPLIES: Power Switch

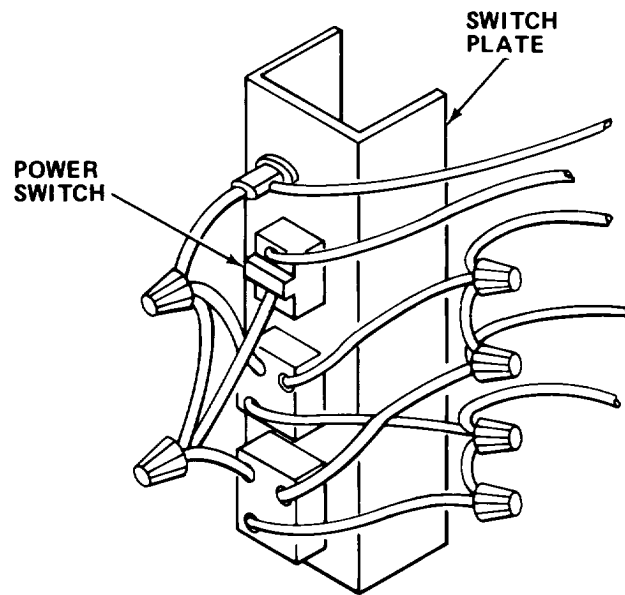
**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.



- c. Remove socket head screws and pull switch plate out.



- d. Tag and disconnect wires from power switch.
- e. Remove defective power switch from front of switch plate.
- f. Install new power switch.
- g. Reconnect wires to power switch and remove tags.
- h. Reinstall switch plate and secure with socket head screws.
- i. Plug in power cord.

#### 2-16.2 Replace Power Cord.

MOS: 83FJ6, Reproduction Equipment Repairer

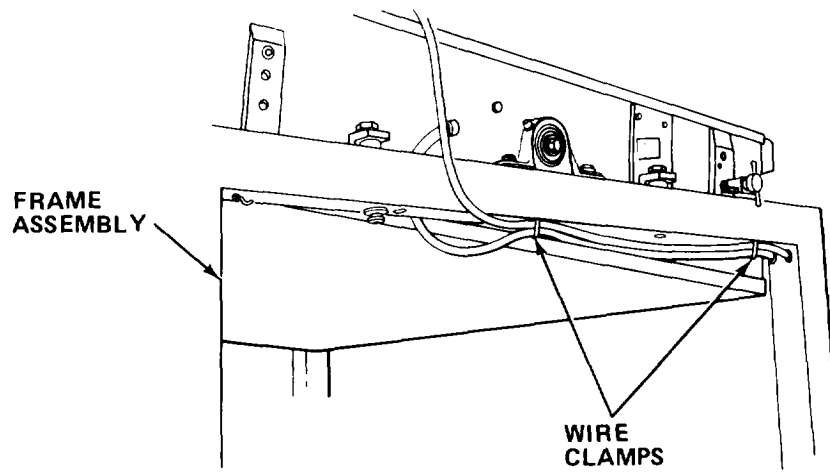
TOOLS: Flat Tip Screwdriver  
Soldering Iron  
5/64 in. Hex Head Key Wrench

SUPPLIES: Power Cord  
Solder (Item 17, Appendix E)

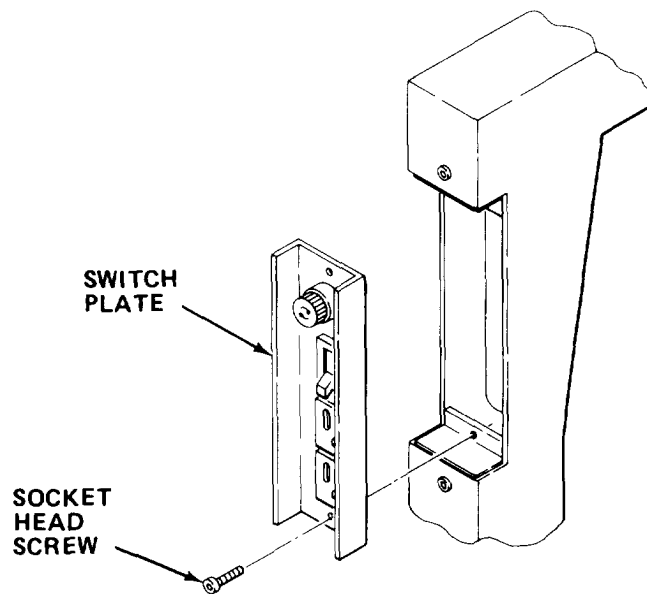
#### WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

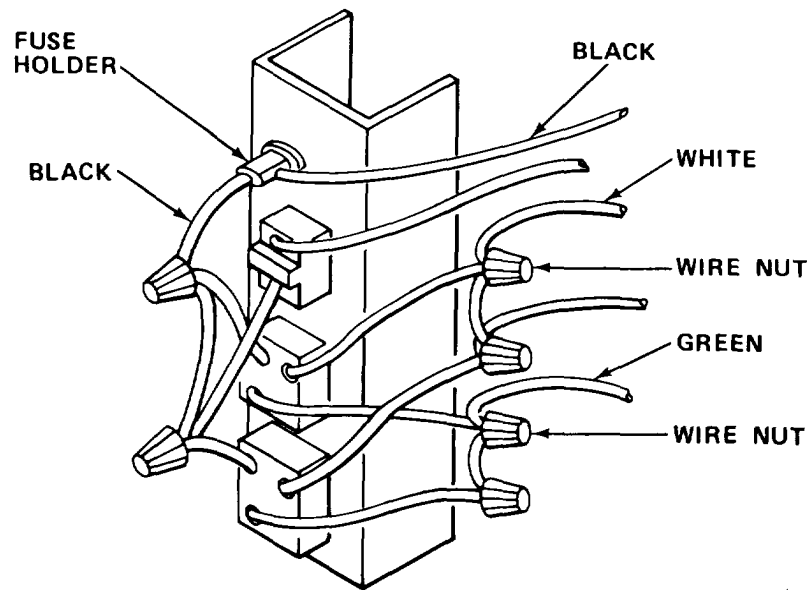
- a. Turn power switch OFF.
- b. Unplug power cord.



- c. Remove wire clamps located on frame assembly.



- d. Remove socket head screws and pull switch plate out.
- e. Tag wire connections for proper reconnection of wires.



- f. Desolder black power cord lead from fuse holder.
- g. Disconnect white lead and green ground at wire nuts.
- h. Remove power cord.
- i. Insert new power cord through hole in back of leg,
- j. Reconnect white lead and green ground; tighten wire nuts.
- k. Solder black lead to fuse holder.
- l. Reinstall wire clamps.
- m. Reinstall switch plate and secure with socket head screws.
- n. Plug in power cord.

2-16.3 Replace Receptacle.

MOS: 83FJ6, Reproduction Equipment Repairer

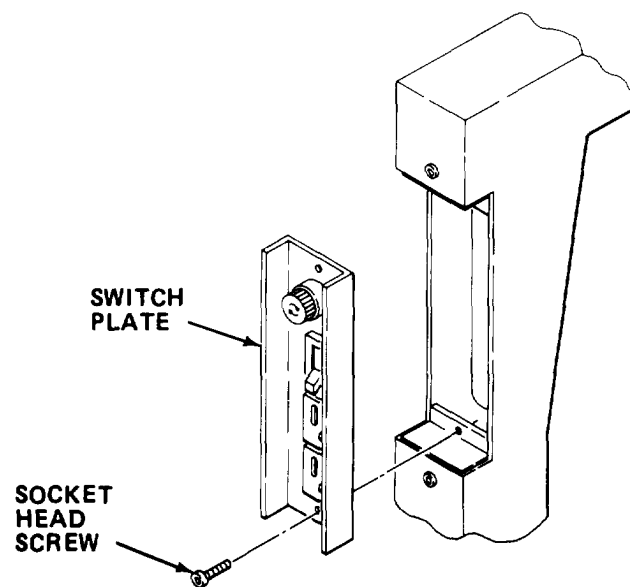
TOOLS: Flat Tip Screwdriver  
5/64 in. Hex Head Key Wrench

SUPPLIES: Receptacle

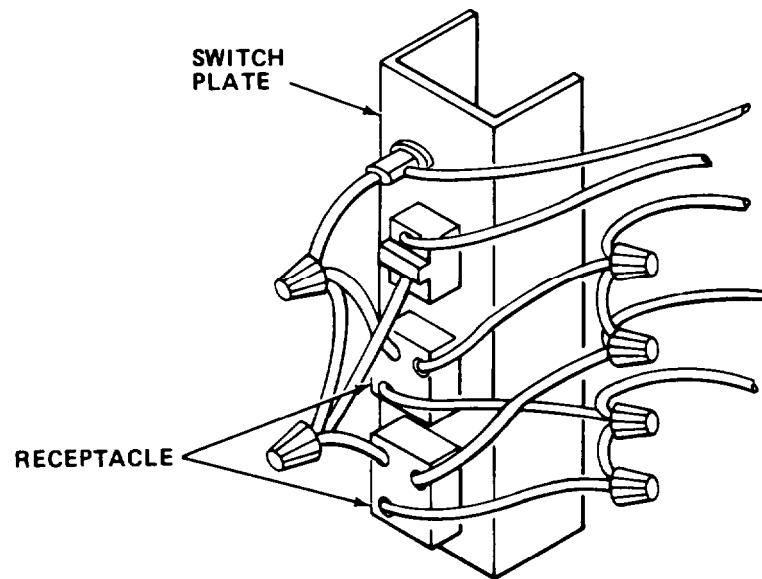
**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.



- c. Remove socket head screws and pull switch plate out.



- d. Tag and disconnect wires from defective receptacle.
- e. Remove defective receptacle from switch assembly.
- f. Install new receptacle and reconnect wires.
- g. Reinstall switch plate and secure with socket head screws.
- h. Plug in power cord.

2-16.4 Replace Lamp Ballast.

MOS: 83FJ6, Reproduction Equipment Repairer

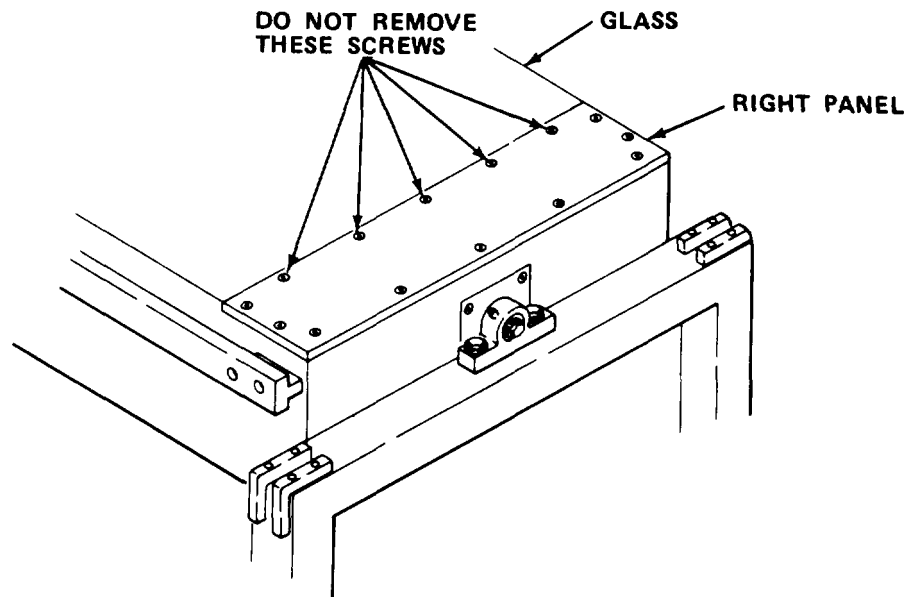
TOOLS: 3/32 in. Hex Head Key Wrench  
1/8 in. Hex Head Key Wrench  
1/4 in. Wrench  
3/8 in. Socket, 1/4 in. Drive  
1/4 in. Drive Ratchet

SUPPLIES: Lamp Ballast

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.

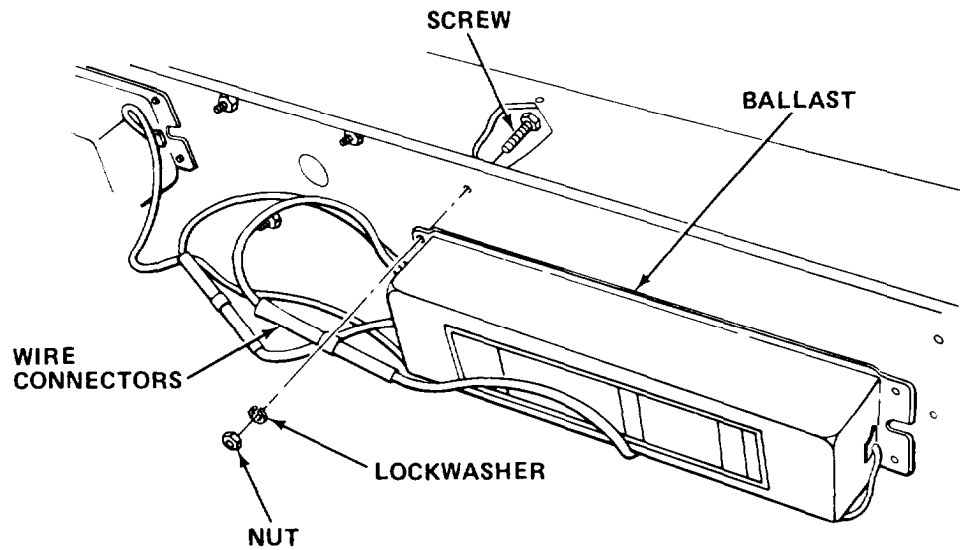


**CAUTION**

Removal of five socket head screws located closest to glass surface may result in damage to equipment.

- c. Remove nine socket head screws and right panel, but do not remove five socket head screws indicated in CAUTION and illustration.





- d. Remove socket head screws, lockwashers, and nuts that secure ballast.
- e. Lift ballast out of table to gain access to wire connectors.
- f. Tag and disconnect all wires.
- g. Install new ballast.

**NOTE**

Be sure wires are not kinked.

- h. Reconnect all wires.
- i. Secure ballast with nuts, lockwashers, and socket head screws.
- j. Reinstall right panel and secure with socket head screws.
- k. Plug in power cord.

2-16.5 Replace Fluorescent Lamp/Starter.

MOS: 83FJ6, Reproduction Equipment Repairer

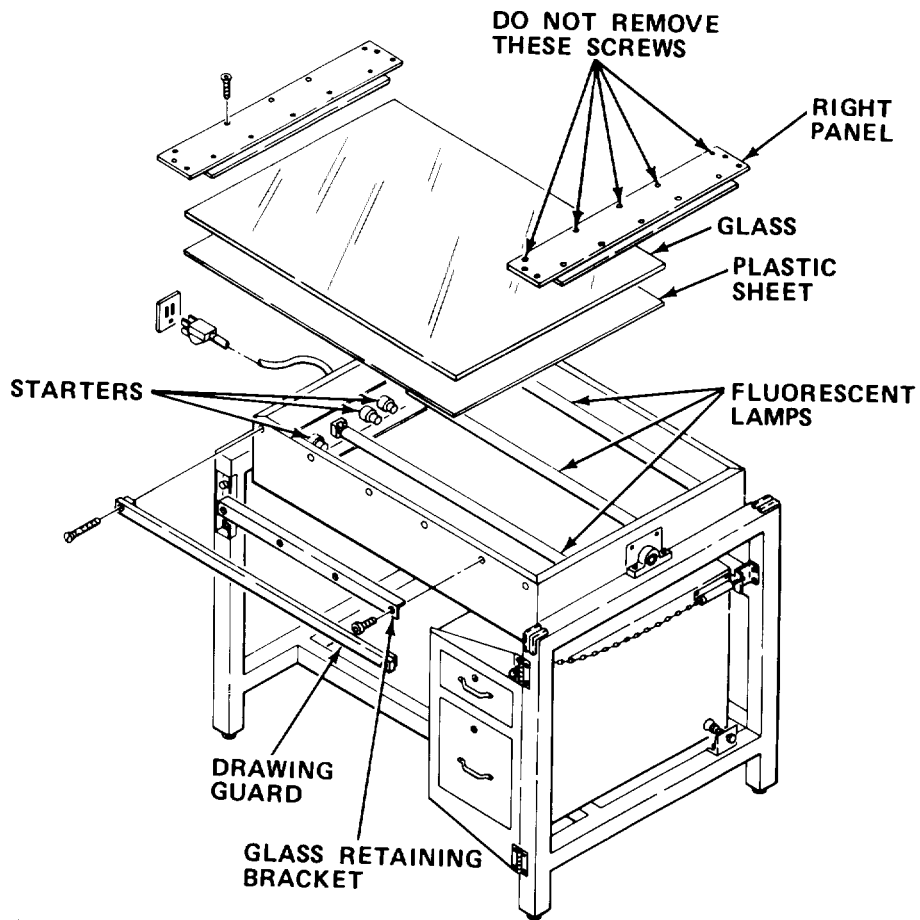
TOOLS: 3/32 in. Hex Head Key Wrench  
Flat Tip Screwdriver

SUPPLIES: Fluorescent Lamp/Starter

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Place light surface up. Turn on power switch and note defective lamp.
- b. Turn off power switch and unplug power cord.



**CAUTION**

Removal of five socket head screws located closest to glass surface may result in equipment damage.

- c. Remove nine socket head screws and right panel, but do not remove five socket head screws indicated in CAUTION and illustration.
- d. Remove socket head screws and drawing guard.
- e. Remove socket head screws and glass retaining bracket.
- f. Carefully slide glass and plastic sheet from retaining glass bracket and left panel.
- g. Remove defective lamp/starter.
- h. Install new lamp/starter.
- i. Reinstall plastic sheet and glass.
- j. Reinstall right panel and secure with socket head screws.
- k. Reinstall glass retaining bracket and secure with socket head screws.
- l. Reinstall drawing guard and secure with socket head screws.
- m. Plug in power cord.

2-16.6 Repair Tilt Lock.

MOS: 83FJ6, Reproduction Equipment Repairer

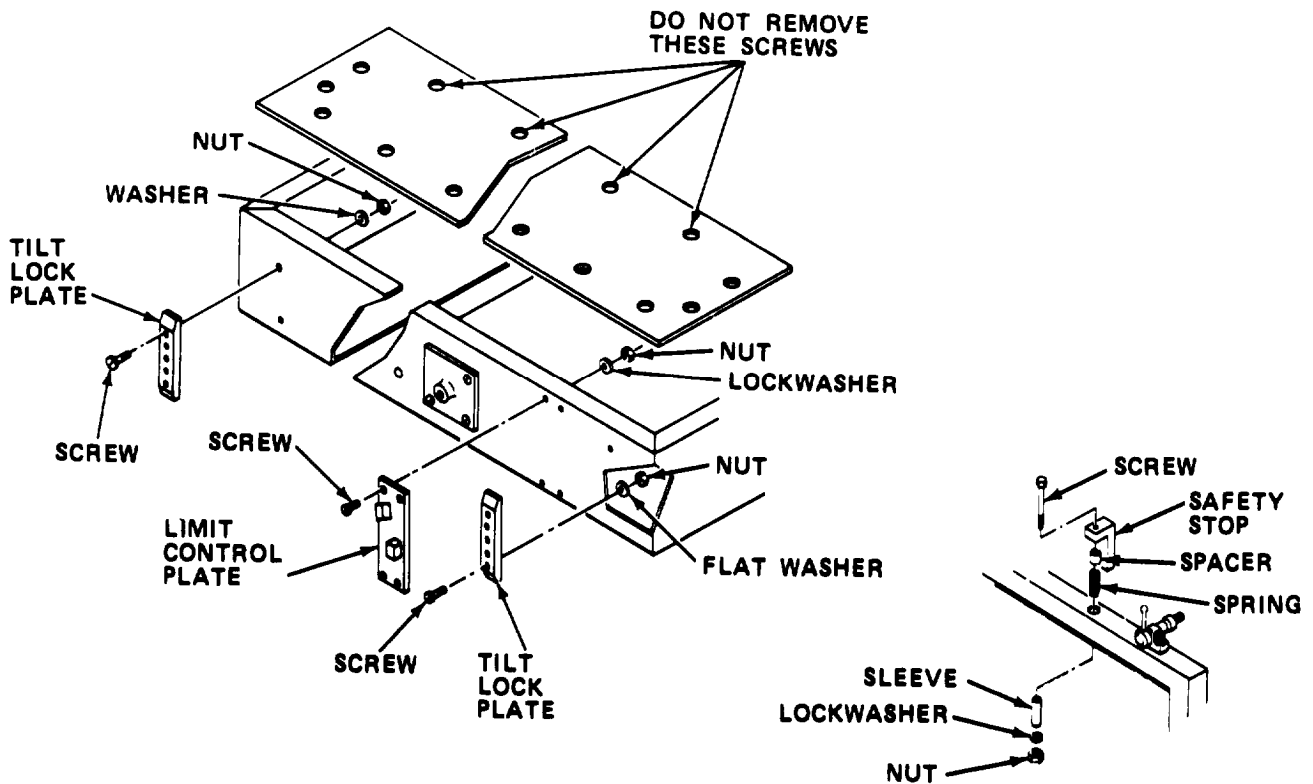
TOOLS: Flat Tip Screwdriver  
7/16 in. Combination Wrench  
9mm Wrench  
3/32 in. Hex Head Key Wrench  
3/16 in. Hex Head Key Wrench  
5/32 in. Hex Head Key Wrench

SUPPLIES: Tilt Lock Plate  
Limit Control Plate  
Safety Stop

WARNING

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.



**CAUTION**

Removal of five socket head screws located closest to glass surface may result in damage to equipment.

- c. Remove nine socket head screws and left panel, but do not remove five socket head screws indicated in CAUTION and illustration.
- d. Pull cabinet assembly lock release and swing cabinet assembly out so that it is not under table.

**NOTE**

Tilt lock plates are not interchangeable and must be replaced in same positions.

- e. Remove upper screws, nuts, and washers from defective tilt lock plate.
- f. Tilt table top as necessary and remove defective tilt lock plate by removing lower screws, nuts, and washers.
- g. Install new tilt lock plate and secure with washers, nuts, and screws.
- h. Check position of tilt lock plate and readjust if required.
- i. Remove defective limit control plate by removing screws, washers, and nuts.
- j. Install new limit control plate. Secure with nuts, washers, and screws.
- k. Reinstall left panel and secure with nine socket head screws.

**NOTE**

Use care in disassembly of safety stop to prevent spring from falling inside frame.

- l. Remove defective safety stop by removing nut, lockwasher, sleeve, spring, spacer, and screw.
- m. Install new safety stop. Secure with screw, spacer, spring, sleeve, lockwasher, and nut.
- n. Swing cabinet assembly to its normal position under table.
- o. Plug in power cord.

2-16.7 Replace Pillow Block Assembly.

MOS: 83FJ6, Reproduction Equipment Repairer

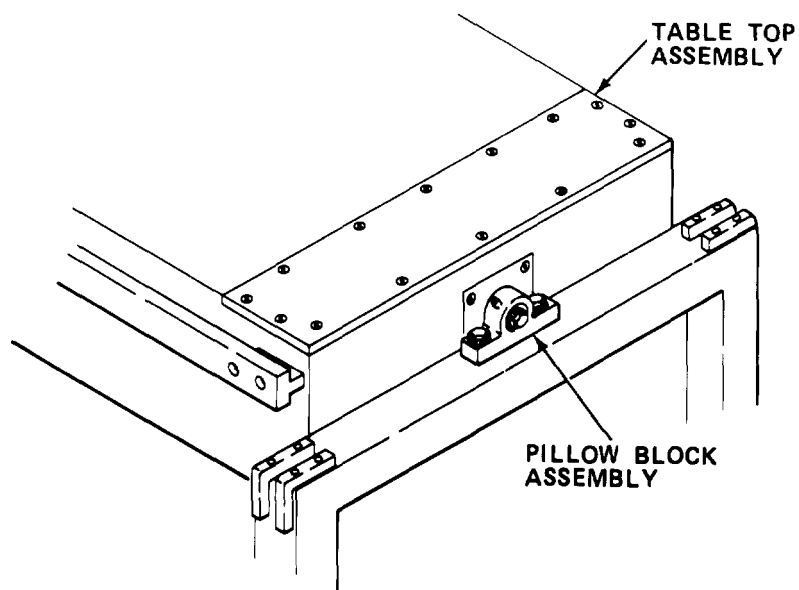
TOOLS: 1/8 in. Hex Head Key Wrench  
9/16 in. Combination Wrench  
1/2 in. Combination Wrench  
Grease Gun

SUPPLIES: Pillow Block Assembly  
GAA Grease (Item 9, Appendix E)

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.

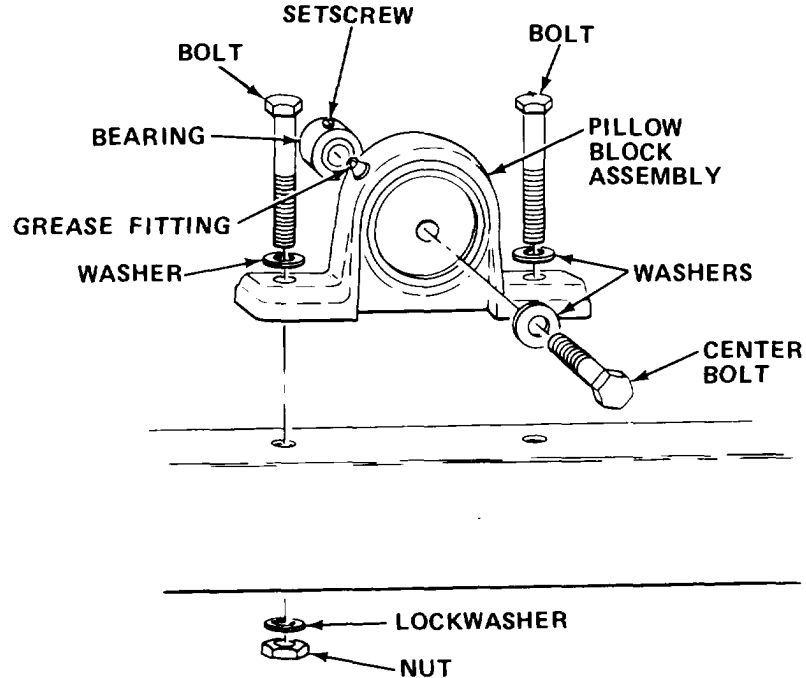


**CAUTION**

Table top assembly must be supported with drafting surface down to prevent table top from falling, causing equipment damage.

- c. Support table top assembly.

- d. Loosen, but do not remove socket head setscrew.



- e. Remove center bolt and washer.
- f. Remove bolts, washers, lockwashers, and nuts; remove defective pillow block assembly.
- g. Install new pillow block assembly and secure with nuts, lockwashers, washers, and bolts.
- h. Grease bearing (Paragraph 2-11.1).
- i. Reinstall washer and center bolt.
- j. Tighten socket head setscrew.
- k. Remove table top assembly supports.

2-16.8 Remove/Install Drafting, Scribing/Tracing Table.

MOS: 83FJ6, Reproduction Equipment Repairer

PERSONNEL: Two persons are required to perform this procedure.

TOOLS: 1/2 in. Drive Socket Set  
Cross Tip Screwdriver

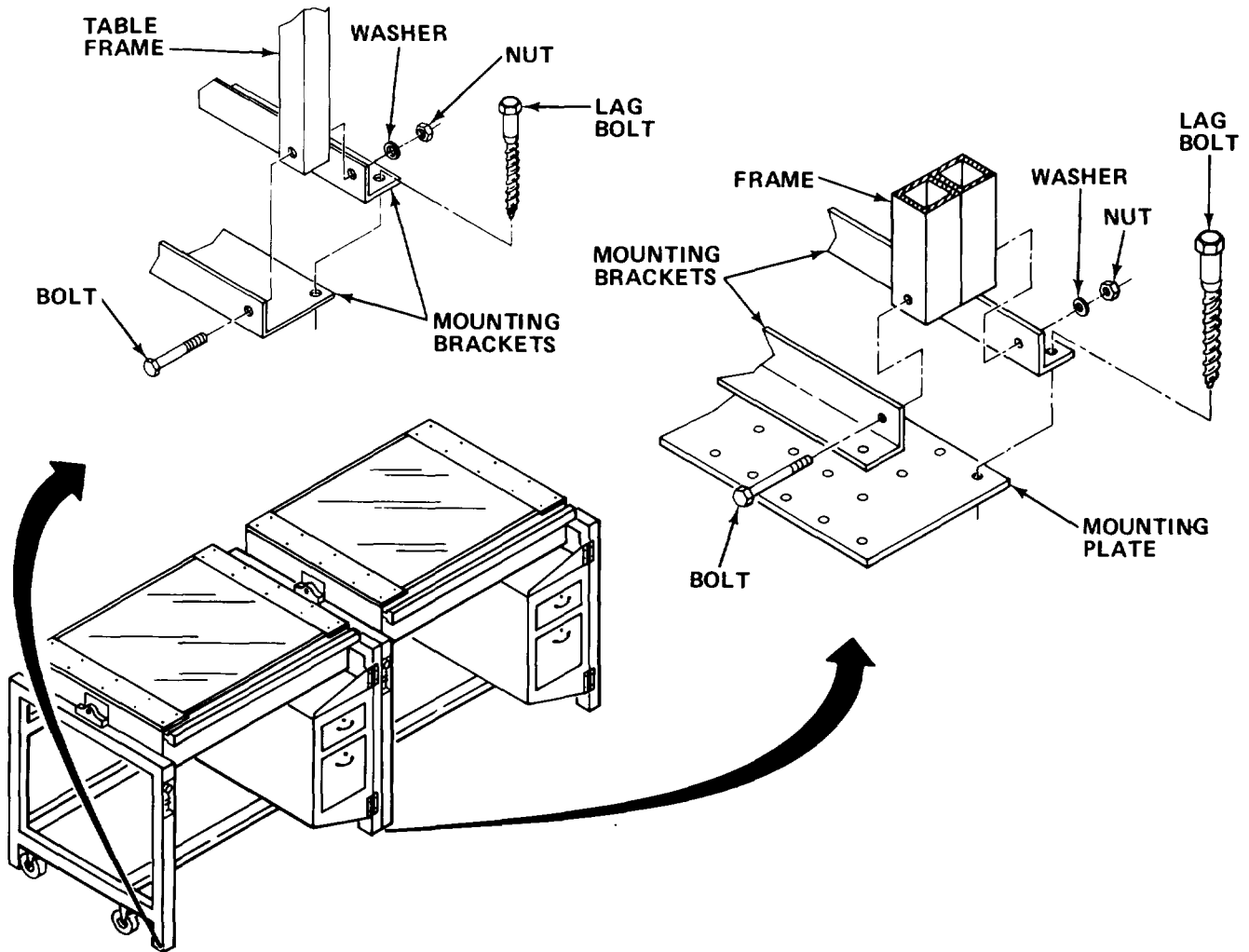
SUPPLIES: Drafting, Scribing/Tracing Table

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

a. Plate mounted:

(1) Unplug power cords.





- (2) Remove bolts, washers, and nuts from table mounting brackets.

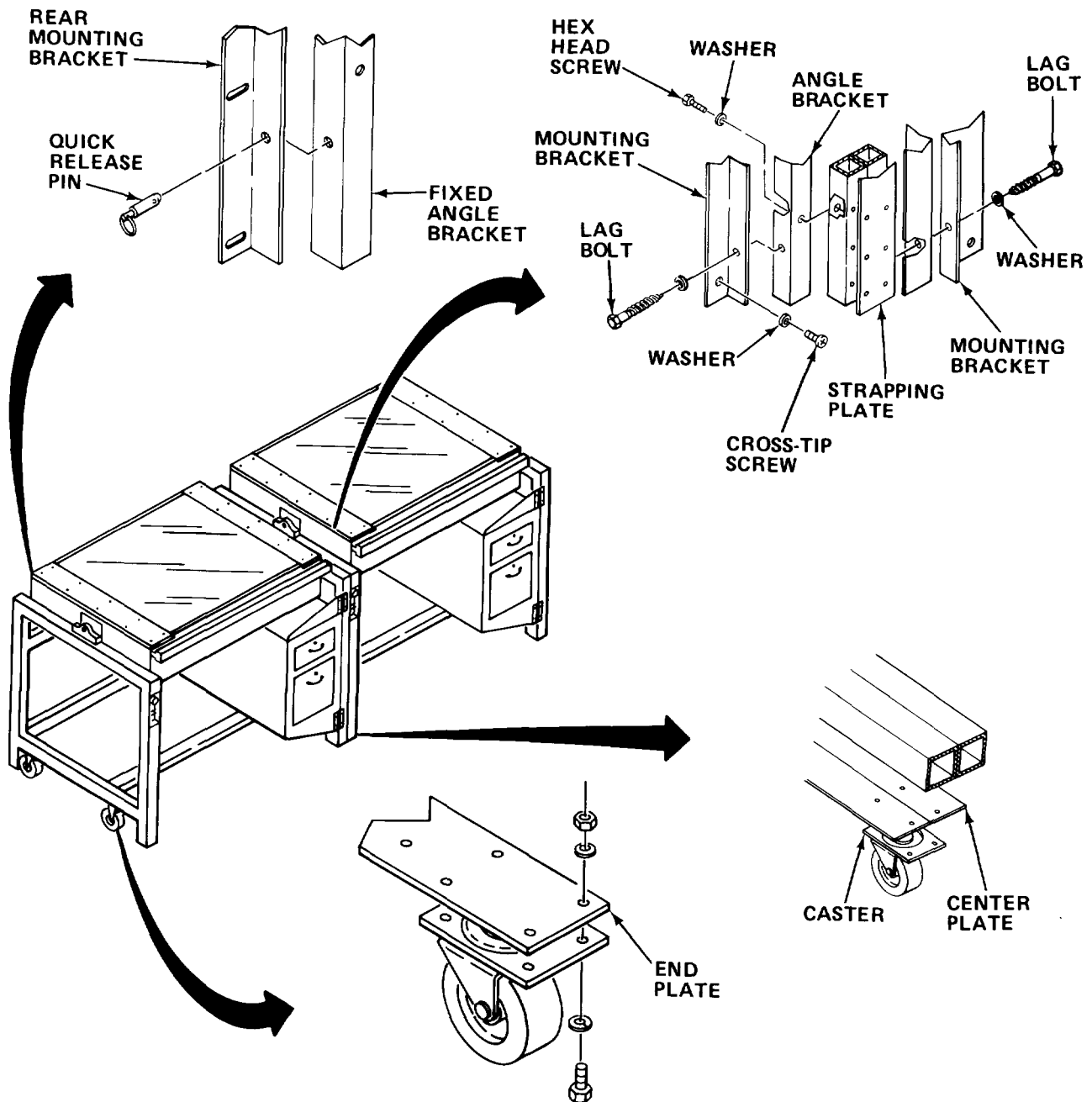
**WARNING**

To prevent personal injury, two persons are required to move the drafting, scribing/tracing table.

- (3) Carefully pull table toward you until it clears table mounting brackets.
- (4) Remove defective table from section.
- (5) Position new drafting, scribing/tracing table in front of table mounting bracket.
- (6) Slide table between table mounting brackets until holes in table frame are aligned with table mounting bracket holes.
- (7) Reinstall bolts, washers, and nuts into table mounting brackets.
- (8) Plug in power cord.

b. Caster mounted:

- (1) Unplug power cords.



- (2) Remove lag bolts holding angle brackets to mounting bracket.
- (3) Remove quick release pins from rear mounting brackets.
- (4) Roll both drafting, scribing/tracing tables away from wall.

- (5) Remove strapping plate.
- (6) Remove bolts and washers holding center plate to defective table.
- (7) Remove bolts and washers holding end plate to defective table.
- (8) Remove angle bracket from defective table.
- (9) Remove fixed angle bracket from defective table.
- (10) Remove defective table from section.
- (11) Install fixed angle bracket on new table.
- (12) Install angle bracket on new table.
- (13) Attach end plate to new table with bolts and washers.
- (14) Attach center plate to new table with bolts and washers.
- (15) Reinstall strapping plate.
- (16) Roll both drafting, scribing/tracing tables against wall.
- (17) Insert quick release pins in rear mounting brackets.
- (18) Attach angle bracket to mounting bracket with lag bolts.
- (19) Plug in power cords.

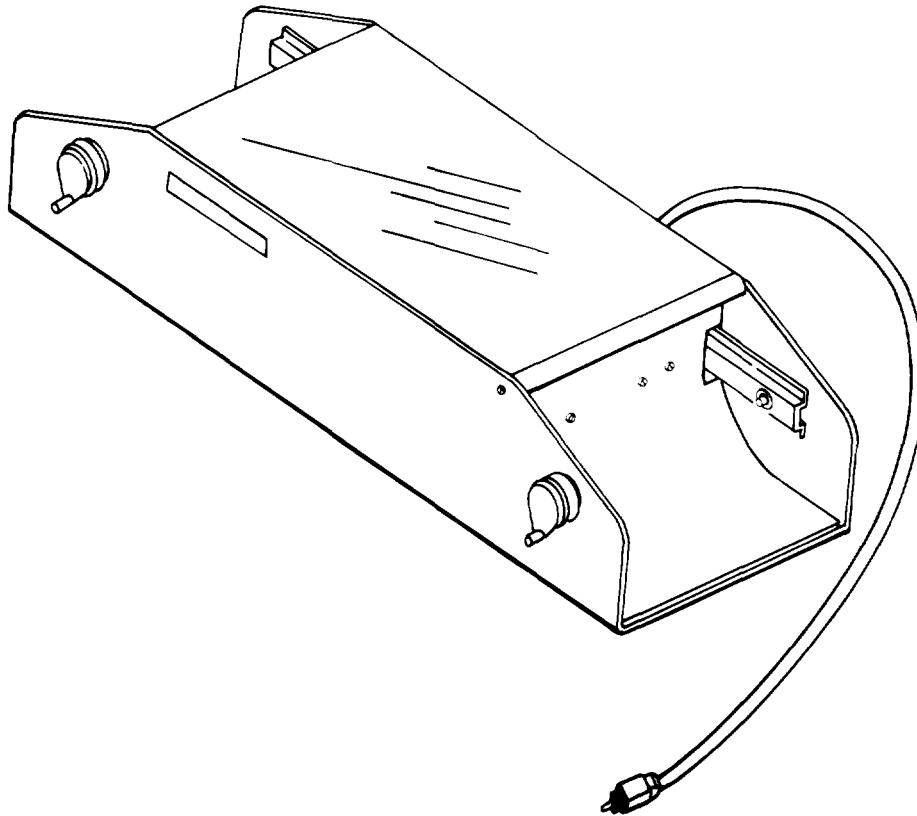
**2-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

#### **Section V DIRECT/GENERAL SUPPORT MAINTENANCE**

There are no direct/general support maintenance procedures assigned for this equipment.







**CHAPTER 3**  
**PORTABLE FILM VIEWER**

**Section I INTRODUCTION**

**3-1. GENERAL INFORMATION.**

3-1.1 Scope.

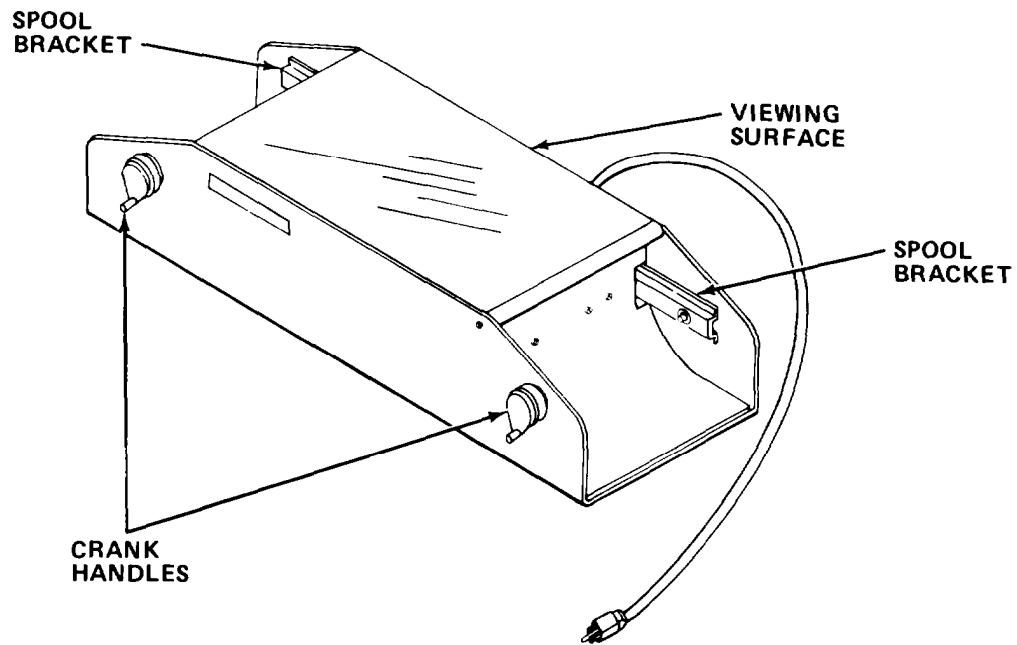
- a. Model Number and Equipment Name. Model 72-0210 Portable Film Viewer.
- b. Purpose of Equipment. To provide a lightweight, portable viewing surface for viewing roll or strip aerial film.

**3-2. EQUIPMENT DESCRIPTION.**

3-2.1 Equipment Characteristics, Capabilities, and Features.

- a. Lightweight.
- b. Portable.
- c. Viewing surface.

3-2.2 Location and Description of Major Components.



VIEWING SURFACE. Lighted surface to view film.

SPOOL BRACKETS. Holds film spools.

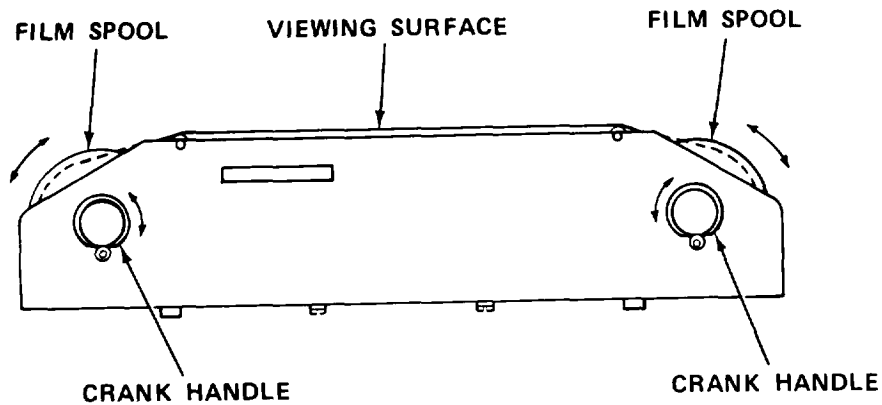
CRANK HANDLES. Used to move film spool.

3-2.3 Equipment Data.

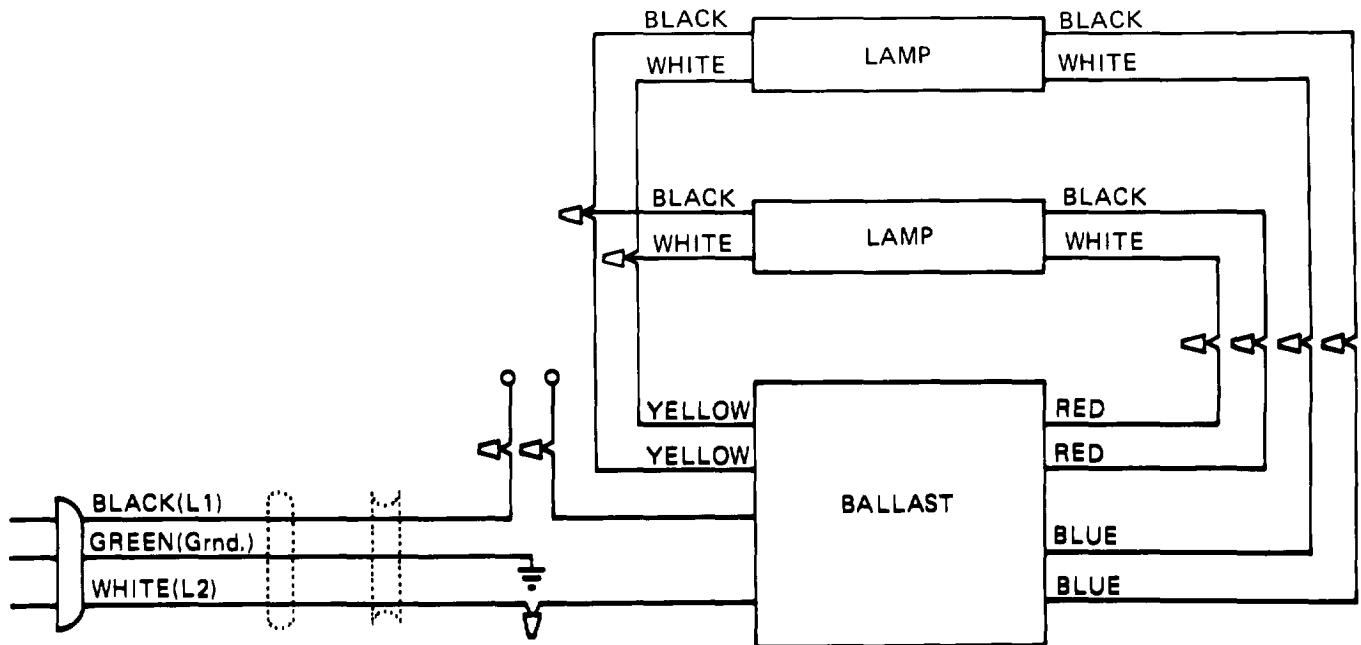
Power Requirements	110 V, 60 Hz
Viewing Area	11.0 in. X 19.0 in. (27.9 cm x 48.3 cm)
Film Size	
Width	9.5 in. (24.1 cm), Max
Length	500 ft (152 m)
Weight	28.0 lbs (12.7 kg)



3-3. TECHNICAL PRINCIPLES OF OPERATION.



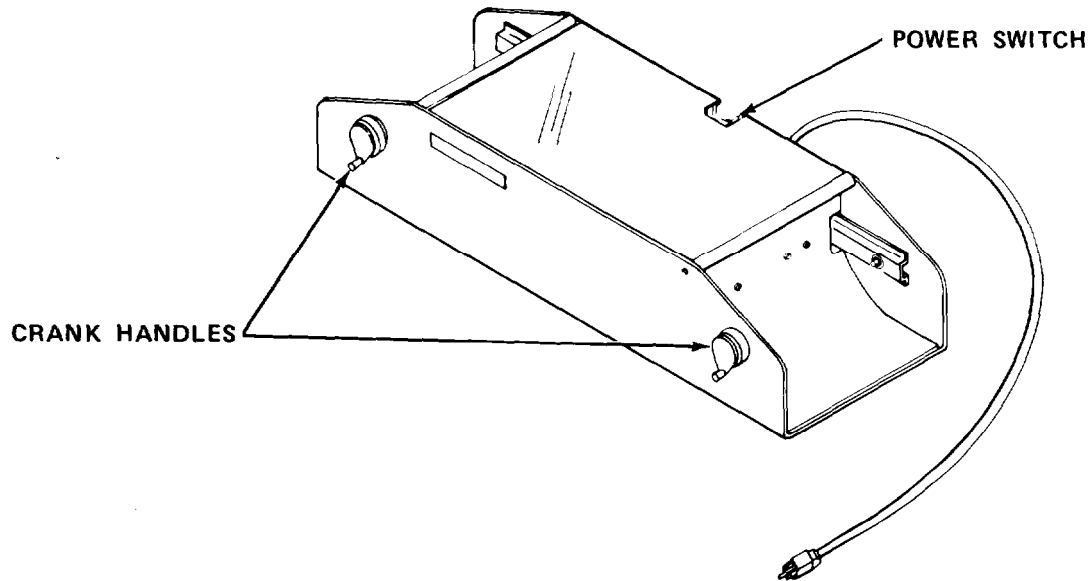
3-3.1 General. Operator manually moves roll of aerial film between film spools by turning crank handles. Film is viewed on lighted viewing surface.



3-3.2 Electrical System. Power switch controls 120 V, 60 Hz power for ballast transformer to light two fluorescent lamps.

Section II OPERATING INSTRUCTIONS

3-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Control or Indicator	Function
Power Switch	Controls power to fluorescent lamps,
Crank Handles	Spring-loaded to hold film spools. Rotated to move film over viewing surface.

3-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

3-5.1 PMCS Procedures.

a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.

b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.

c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.

d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.

e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

g. Interval columns. This column determines the time period designated to perform your PMCS.

h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Cheesecloth (Item 5, Appendix E)	ar
Lens Cleaner (Item 4, Appendix E)	ar
Silicone Spray (Item 20, Appendix E)	ar

Table 3-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can safely be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

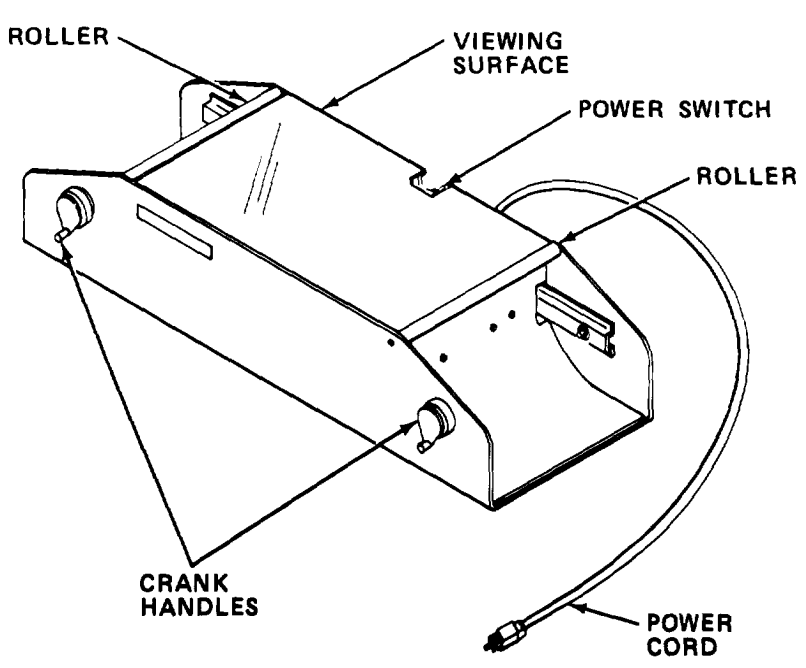
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><b>PORTABLE FILM VIEWER</b></p> <p>Inspect Viewer.</p>  <p>1. Inspect power cord for kinks, breaks, or burns.</p>	Defective power cord.

Table 3-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><b><u>PORTABLE FILM VIEWER - Cont</u></b></p> <p><u>Inspect Viewer - Cont</u></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Death or serious injury may occur if portable film viewer is operated with defective power cord.</p> <ol style="list-style-type: none"> <li>2. Plug in power cord.</li> <li>3. Turn power switch ON.</li> <li>4. Observe even lighting of viewing surface.</li> <li>5. Turn power switch OFF.</li> <li>6. Unplug power cord.</li> <li>7. Rotate crank handles to right and left. Observe free rotation.</li> <li>8. Check rollers for free movement.</li> <li>9. Pull crank handles away from viewer. Spring tension will return handles to original position when released.</li> <li>10. Turn power switch OFF.</li> <li>11. Unplug power cord.</li> </ol>	

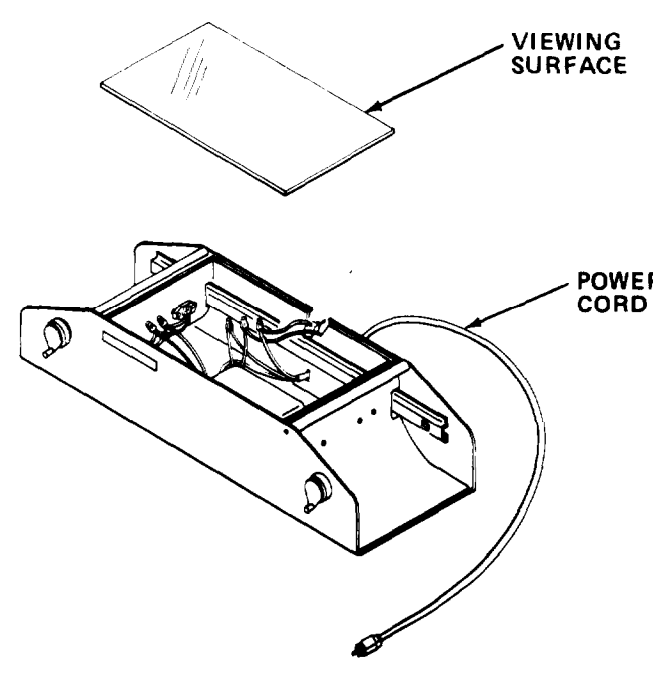
Table 3-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	B	<p><u>PORTABLE FILM VIEWER - Cont</u></p> <p><u>Clean Viewing Surface.</u></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Death or serious injury may occur from electrical shock if power cord is not unplugged before servicing.</p>  <p>1. Unplug power cord.</p> <p>2. Lift viewing surface from viewer.</p> <p>3. Wipe viewing surface with cheesecloth dampened with lens cleaner.</p> <p>4. Dry viewing surface with dry cheesecloth.</p> <p>5. Reinstall viewing surface.</p>	

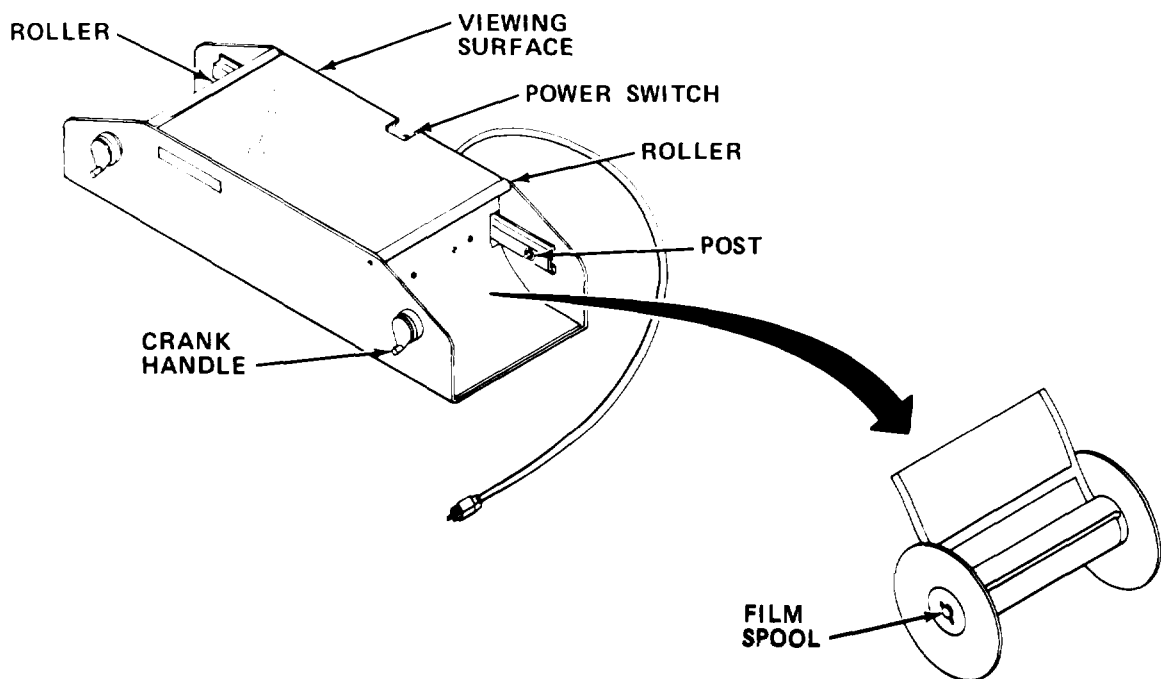
### 3-6. OPERATION UNDER USUAL CONDITIONS.

#### 3-6.1 Operating Procedures.

#### **CAUTION**

Hold viewing surface in place when viewer is removed from mounting bracket to prevent damage to viewing surface.

- a. Remove film viewer from mounting bracket and place film viewer on available work surface.
- b. Plug power cord into electrical receptacle.



- c. Pull crank handle away from viewer, and insert film spool on post. Then release crank handle and engage film spool.

#### **NOTE**

Either left or right end of viewer may be used, depending on operator's preference and which film spool has film wound on it. Care must be taken to be certain film is not viewed from wrong side.

- d. Pull film from spool over rollers.

e. Thread film on empty film spool and rotate crank handles to draw film tightly over viewing surface.

**NOTE**

Film must be over rollers and tight to provide undistorted view.

- f. Turn power switch ON.
- g. Rotate crank handles to draw film in desired direction.
- h. On completion of task, rewind film.
- i. Turn power switch OFF.
- j. Remove film spool by pulling crank handles away from viewer and lifting spool free.
- k. Store film and spools.
- l. Unplug power cord.

**CAUTION**

Hold viewer surface in place when viewer is placed in mounting bracket to prevent damage to viewing surface.

- m. Store viewer in mounting bracket.

**3-6.2 Preparation for Movement.**

- a. Turn power switch OFF.
- b. Unplug power cord.
- c. Wrap and tape power cord.

**CAUTION**

Hold viewing surface in place when viewer is placed in mounting bracket to prevent damage to viewing surface.

- d. Mount and secure viewer in mounting bracket.

**3-7. OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.



**Section III OPERATOR MAINTENANCE**

**3-8. LUBRICATION INSTRUCTIONS.**

**NOTE**

These lubrication instructions are mandatory.

3-8.1 Rollers. Apply silicone spray (Item 19, Appendix E) monthly to roller cranks, handles, and shafts.

**3-9. TROUBLESHOOTING PROCEDURES.**

a. The table lists the common malfunctions which you may find during operation or maintenance of the portable film viewer or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

**Table 3-2. TROUBLESHOOTING**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. FLUORESCENT LAMP DIMS OR FLICKERS.	Raise cover to determine which fluorescent lamp is defective.	Replace fluorescent lamp (paragraph 3-10.1).
2. FLUORESCENT LAMPS FLICKER.	Raise cover to gain access to defective fluorescent lamps.	(a) Replace defective fluorescent lamps (paragraph 3-10.1). (b) If fluorescent lamps continue to flicker, refer to organizational maintenance.

Table 3-2. TROUBLESHOOTING - Cont

---

MALFUNCTION	
TEST OR INSPECTION	
CORRECTIVE ACTION	

---

3. FLUORESCENT LAMPS DO NOT LIGHT.

Step 1. Check that power cord is plugged in.

- (a) If plugged in, proceed to step 2.
- (b) If unplugged, plug in.

Step 2. Check that power switch is ON.

- (a) If switch is OFF, turn ON.
- (b) If switch is ON, refer to organizational maintenance.

---

**3-10. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering operator maintenance functions for the portable film viewer. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

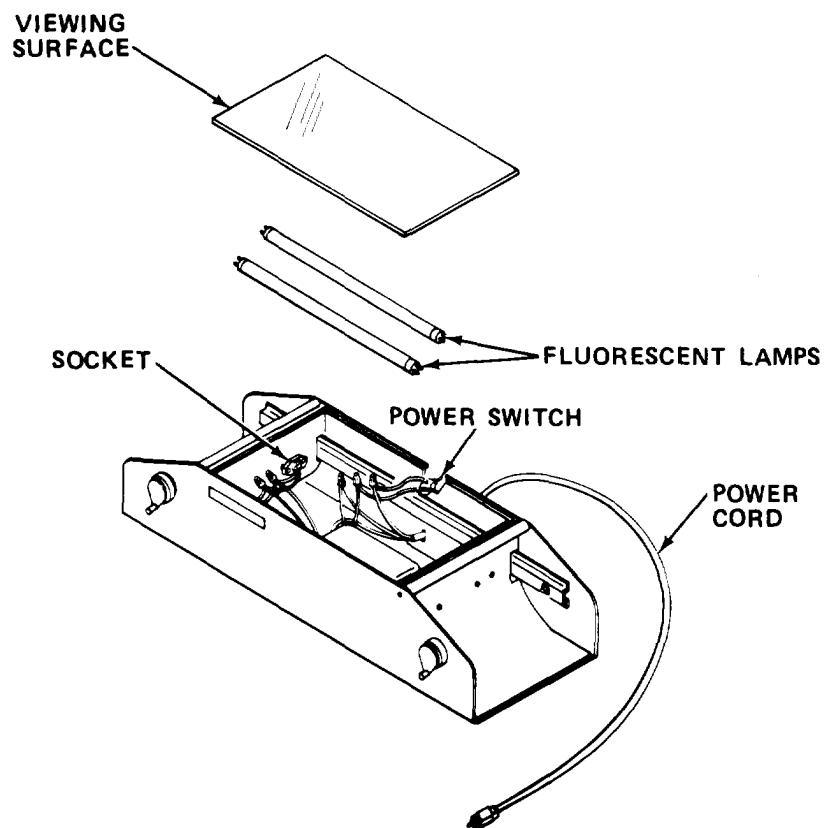
PROCEDURE	PARAGRAPH
Replace Fluorescent Lamp . . . . .	3-10.1

### 3-10.1 Replace Fluorescent Lamp.

MOS: 81C, Cartographer

TOOLS: None

SUPPLIES: Fluorescent Lamp



#### **WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.
- c. Remove viewing surface and set aside.
- d. Remove defective fluorescent lamp by moving it toward spring-loaded socket until prongs clear larger socket. Then remove fluorescent lamp.

- e. Install new fluorescent lamp by inserting prongs in holes in spring-loaded socket. Push fluorescent lamp toward socket until prongs at other end are aligned with holes in larger socket. Release pressure to seat fluorescent lamp.
- f. Reinstall viewing surface.
- g. Plug in power cord.
- h. Turn power switch ON.

## Section IV ORGANIZATIONAL MAINTENANCE

**3-11. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication at this maintenance level.

### **3-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

3-12.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-12.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

3-12.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-314-24P covering organizational maintenance for this equipment.

### **3-13. SERVICE UPON RECEIPT.**

#### 3-13.1 Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

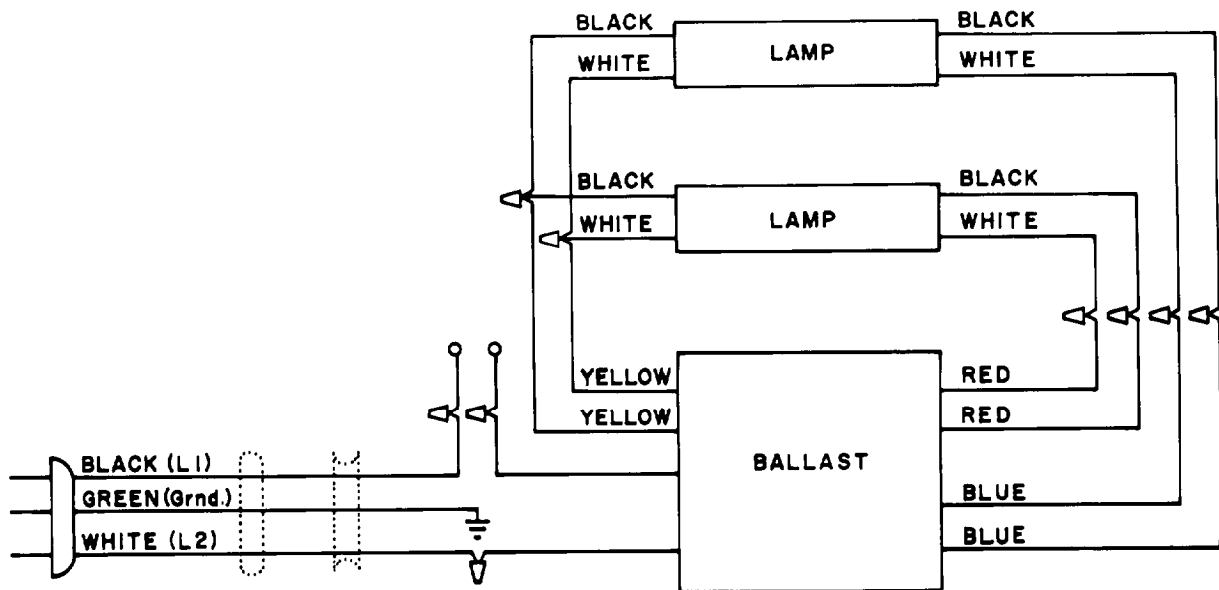
**3-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

**3-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.**

a. Organizational troubleshooting procedures cover the most common malfunctions that may be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by lower level maintenance should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the following schematic or the foldout located at the end of this manual for further fault analysis.



d. If the portable film viewer does not power-up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power procedures for dead receptacle (Table 1-4).

**Table 3-2. ORGANIZATIONAL TROUBLESHOOTING**

---

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. FLUORESCENT LAMPS FLICKER.		Raise cover to gain access to ballast transformer. Replace ballast transformer (paragraph 3-16.2).
2. FLUORESCENT LAMPS ARE NOT LIT.		Check continuity of power switch. (a) If continuity exists, replace ballast transformer (paragraph 3-16.2). (b) If no continuity exists, replace power switch (paragraph 3-16.1).

---

**3-16. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering organizational maintenance functions for the portable film viewer. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

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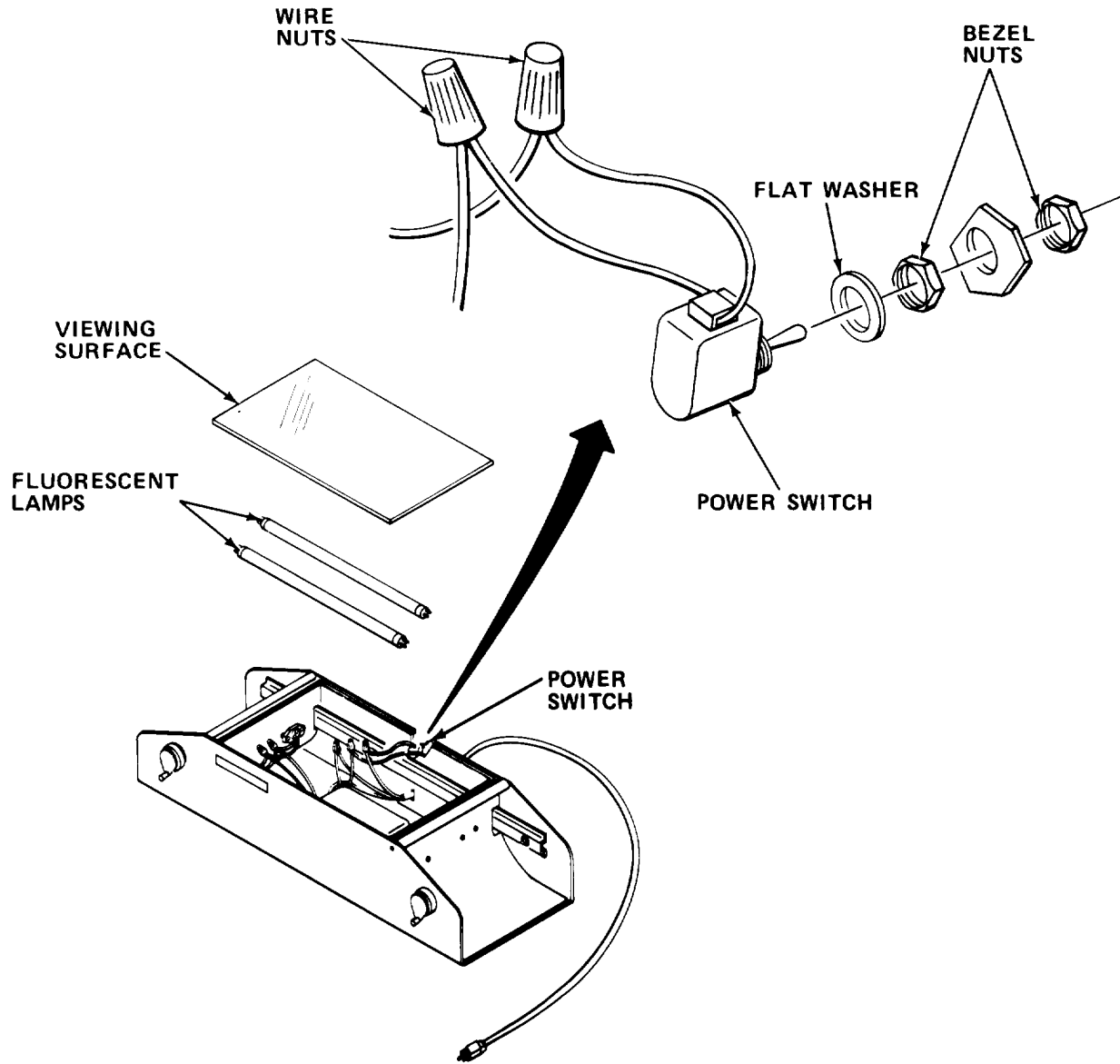
PROCEDURE	PARAGRAPH
Replace Power Switch . . . . .	3-16.1
Replace Ballast Transformer . . . . .	3-16.2
Remove/Install Portable Film Viewer Mounting Assembly . . . . .	3-16.3

3-16.1 Replace Power Switch.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 9/16 in. Combination Wrench

SUPPLIES: Power Switch



**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power switch OFF.



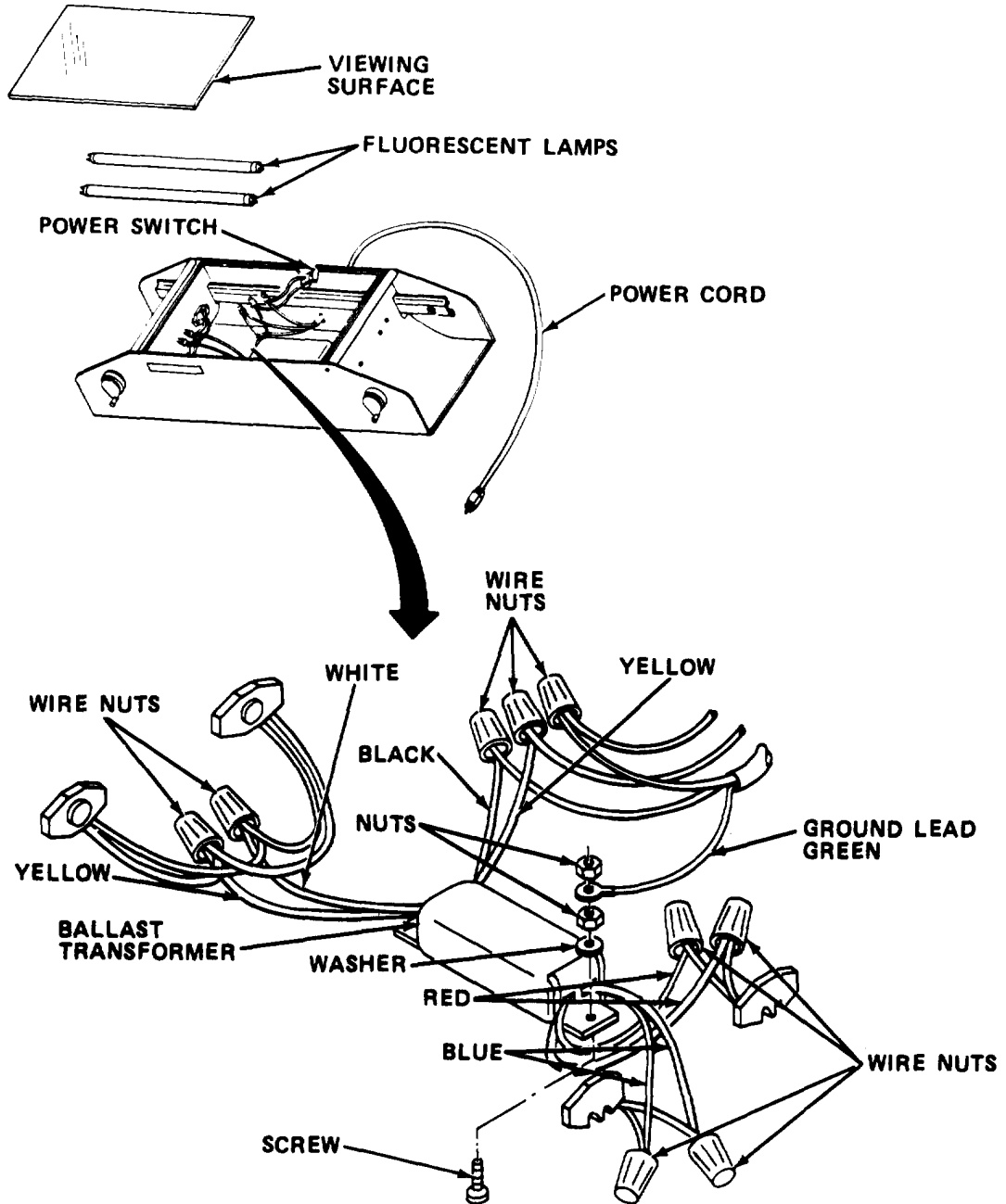
- b. Unplug power cord.
- c. Lift viewing surface and set aside.
- d. Remove fluorescent lamps and set aside.
- e. Disconnect wiring at wire nuts.
- f. Remove outer bezel nut securing power switch to portable film viewer.  
Remove power switch.
- g. Note position of inner bezel nut and remove from defective power switch.  
Install inner bezel nut on new power switch close to the noted position.
- h. Insert new power switch through portable film viewer and secure with  
outer bezel nut.
- i. Reconnect wiring.
- j. Reinstall fluorescent lamps.
- k. Reinstall viewing surface.
- l. Plug in power cord.
- m. Turn power switch ON.

3-16.2 Replace Ballast Transformer

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
5/16 in. Wrench  
9 mm Wrench

SUPPLIES: Ballast Transformer  
Wire Ties  
Wire Nuts



**WARNING**

Death or serious injury may occur from electrical shock unless power is unplugged before servicing.

- a. Turn power switch OFF.
- b. Unplug power cord.
- c. Lift viewing surface and set aside.
- d. Remove fluorescent lamps and set aside.
- e. Tag and disconnect wires at wire nuts.

**NOTE**

Before removing any wire nuts, make note of electrical lead colors and routing to wire nuts.

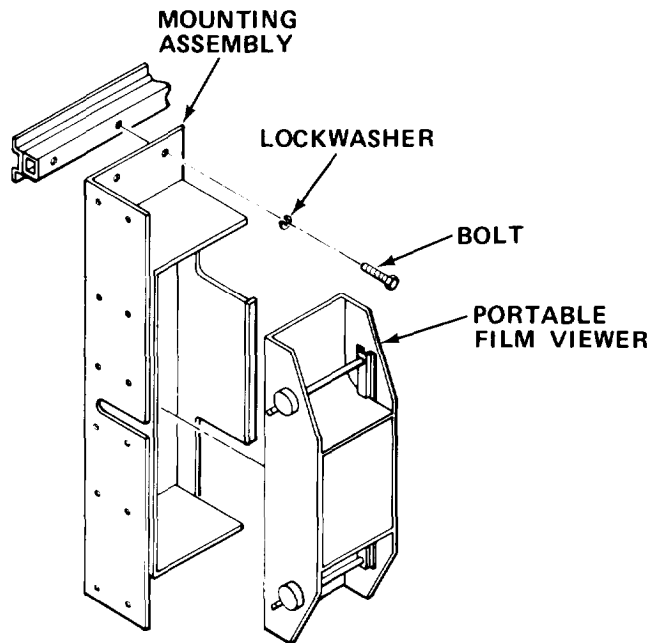
- f. Remove wire ties.
- g. Remove ground lead attaching nut from left side of ballast transformer bracket and remove lead.
- h. Remove screws, washers, and nuts from ballast transformer bracket and remove defective ballast transformer.
- i. Install new ballast transformer in correct position (noting wire colors), and secure brackets in place with nuts, washers, and screws.
- j. Reconnect ground lead to transformer bracket screw and secure with nut.
- k. Connect wires. Secure with wire nuts.
- l. Secure wire bundles with new wire ties.
- m. Reinstall fluorescent lamps.
- n. Reinstall viewing surface.
- o. Plug in power cord.
- p. Turn power switch ON.

3-16.3 Remove/Install Portable Film Viewer Mounting Assembly.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 1/2 in. Socket, 1/4 in. Drive  
1/4 in. Drive Ratchet

SUPPLIES: Portable Film Viewer Mounting Assembly



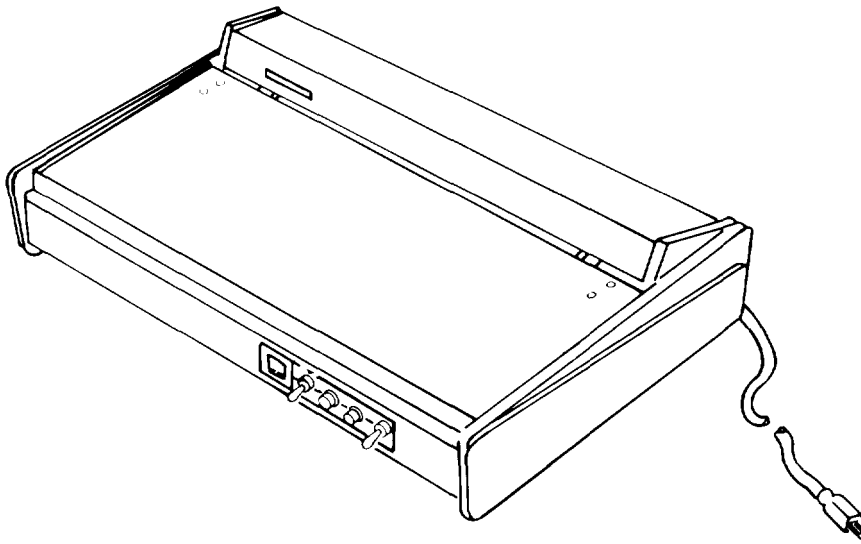
- a. Remove portable film viewer.
- b. Remove bolts and lockwashers holding defective mounting assembly to wall.
- c. Install new portable film viewer mounting assembly and secure with lockwashers and bolts.
- d. Reinstall portable film viewer in mounting assembly.

**3-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE**

There are no direct/general support maintenance procedures assigned for this equipment.





**CHAPTER 4**  
**ADHESIVE WAX COATER**

**Section I INTRODUCTION**

**4-1. GENERAL INFORMATION.**

4-1.1 Scope.

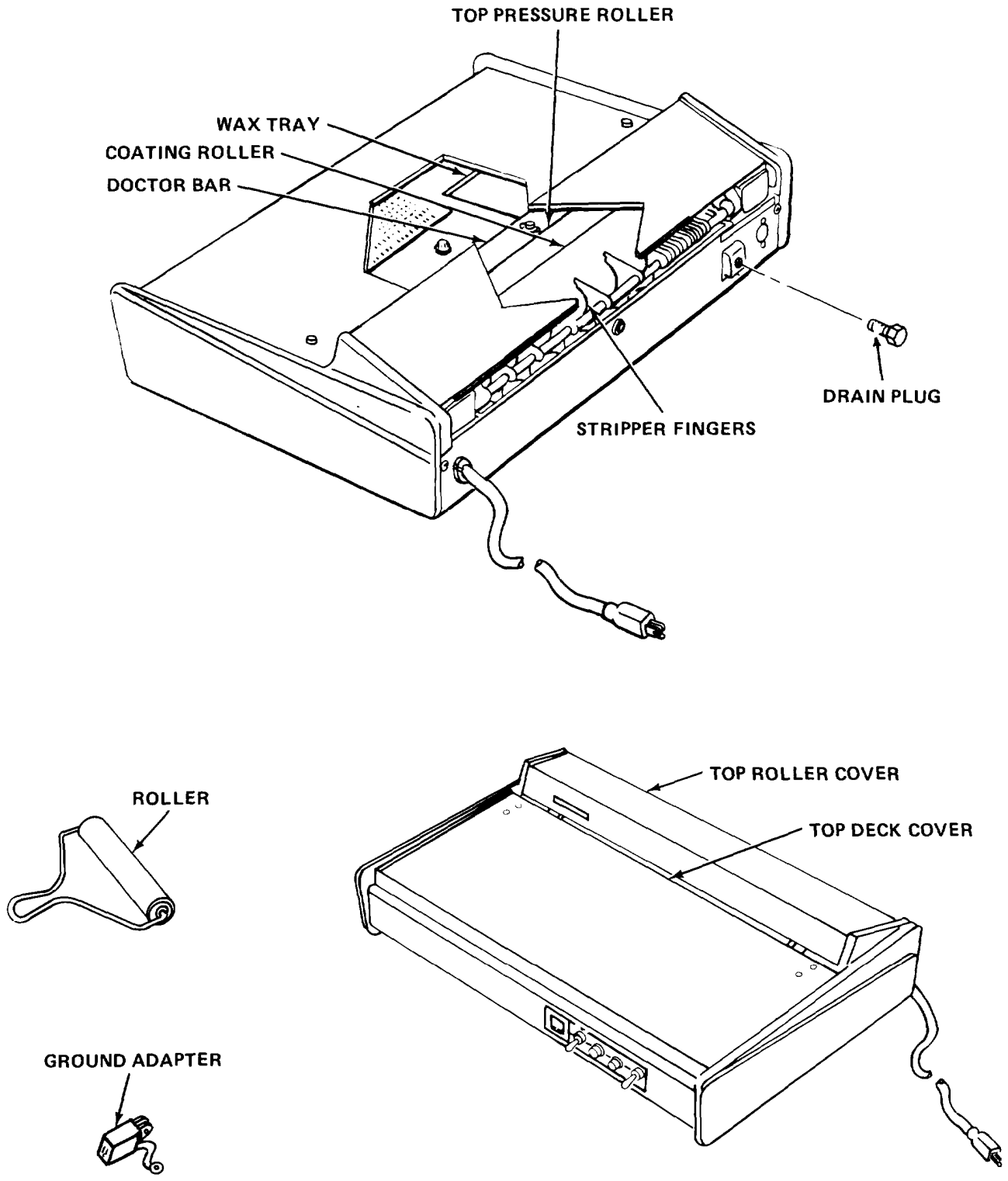
- a. Model Number and Equipment Name. Model 1215 Adhesive Wax Coater.
- b. Purpose of Equipment. To lay adhesive wax coating on back of artwork and text to enable it to be mounted for copying.

**4-2. EQUIPMENT DESCRIPTION.**

4-2.1 Equipment Characteristics, Capabilities, and Features.

- a. Coats only one surface.
- b. Warms up in 15 min (average).
- c. Controls temperature of wax during coating.
- d. WAX LEVEL indicator tells with glance if reservoir is at proper level.
- e. Feed rollers and controls are automatically held inoperative until proper operating temperature is reached.
- f. Floating top feed roller automatically adjusts for all thicknesses and types of paper.
- g. Drain plug allows wax to be drained without handling hot wax.

4-2.2 Location and Description of Major Components.





TOP ROLLER COVER. Metal dust cover prevents foreign matter from settling on top pressure roller when wax coater is not in use.

TOP DECK COVER. Metal cover provides smooth surface for feeding of stock. Its position controls stiffness or weight of stock being fed into wax coater.

GROUND ADAPTER. Converts three-pronged power plug into two-pronged.

ROLLER. Hand-held roller used when mounting coated material.

WAX TRAY. Heated tray melts and holds hot wax for use.

TOP PRESSURE ROLLER. Presses input material against coating roller.

DRAIN PLUG. Cold plug for draining of hot wax.

COATING ROLLER. Applies wax to material.

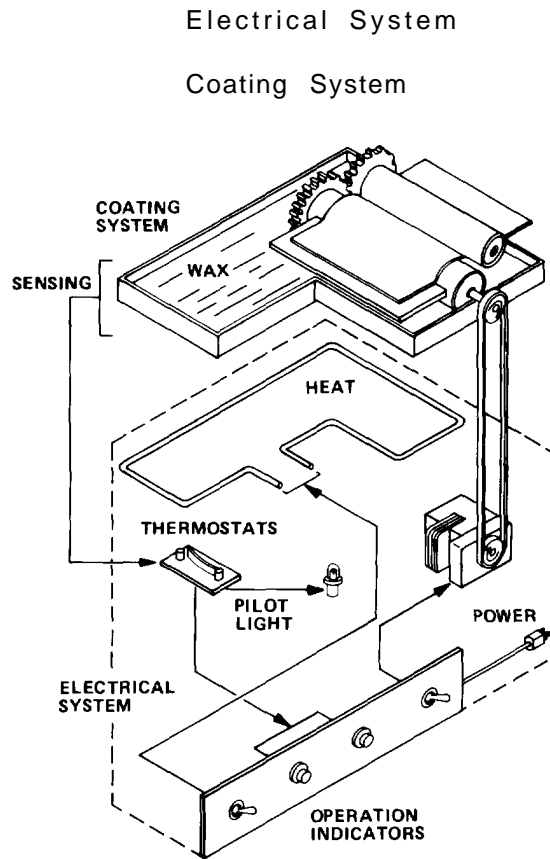
STRIPPER FINGERS. Strips coated material from coating roller.

DOCTOR BAR. Strips excess wax from coating roller.

4-2.3 Equipment Data.

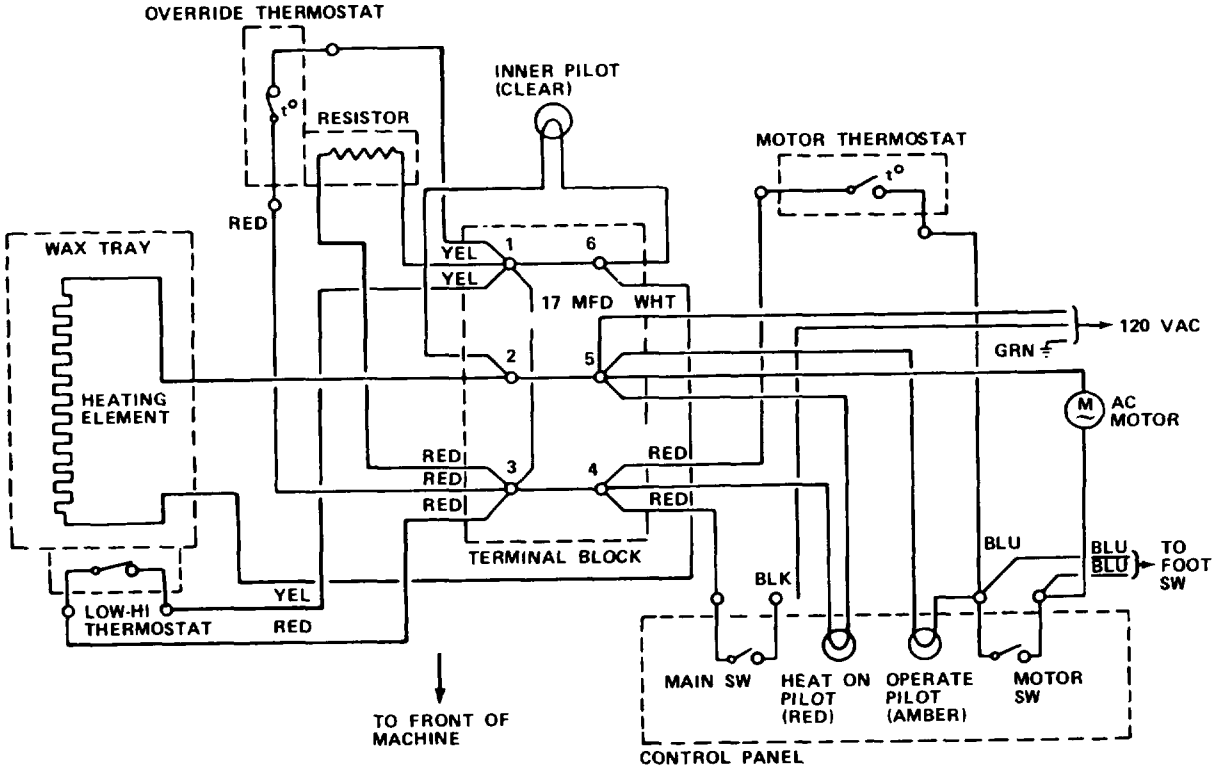
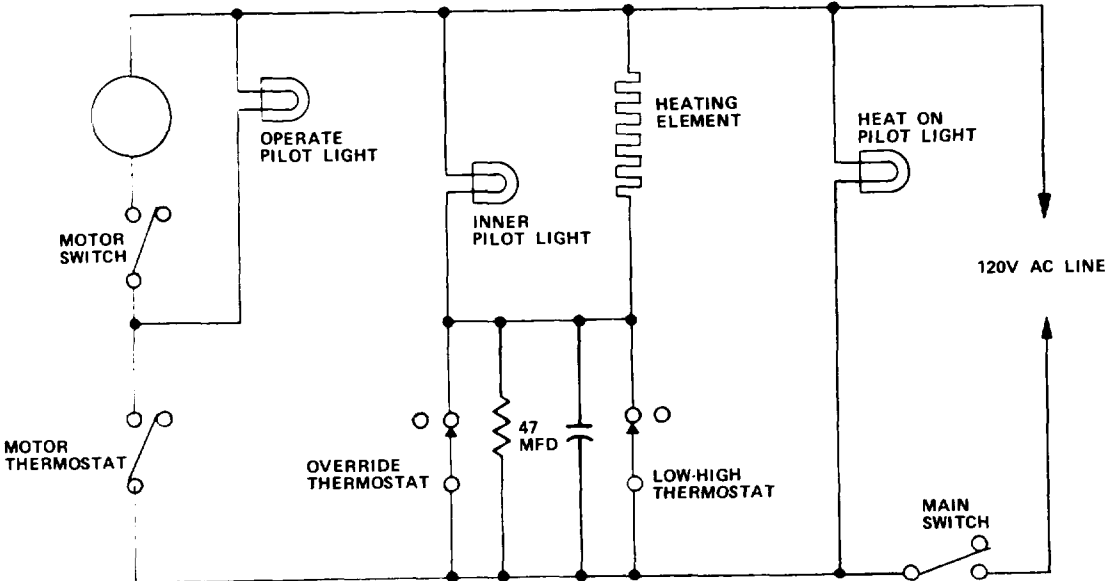
Manufacturer	Daige Products, Inc.
Weight	32 lbs (14.5 kg)
Power Requirements	120 V, 60 Hz, 650 W, Max
Dimensions	
Width	19 in. (48.2 cm)
Depth	14 in. (35.6 cm)
Height	5 in. (12.7 cm)
Roller Width	12 in. (30.5 cm)
Coatable Material Thickness	1/4 in. (6 mm), Max
Warm-Up Period	18 Min, Max

4-3. TECHNICAL PRINCIPLES OF OPERATION. The wax coater applies a coat of adhesive wax to paste-up and layout material for hardboard mounting. It is composed of the following:



4-3.1 Electrical System. Provides controlled heating and transports power to the coating system. It is composed of the following functional components:

- Switches
- HEAT ON Pilot Light
- Heating Element
- LOW/HIGH Thermostat
- Inner Pilot Light
- Coupled Resistor and Capacitor
- Override Thermostat
- Motor Thermostat
- OPERATE Pilot Light
- AC Motor



a. Switches. Control input of power to wax coater. The MAIN switch is the primary control switch enabling power input to the rest of the system. The MOTOR switch controls power input to the ac motor.

b. HEAT ON pilot light. When MAIN switch is thrown, power is applied to the HEAT ON pilot light, heating element, and motor portions of the circuit. The HEAT ON pilot light remains on as long as the MAIN switch is closed and the power is being applied, to indicate the system is under power.

c. Heating element. Input power is applied to the heating element via the LOW/HIGH thermostat, override thermostat, and the coupled resistor and capacitor. The heating element heats the wax tray and wax to the desired temperature.

d. LOW/HIGH thermostat. Limits the temperature reached by the heating element coils. It is normally closed. When the desired temperature is reached, the thermostat opens and cuts power to the element.

e. Inner pilot light. Indicates when power is being applied to the heating element. It is coupled in parallel with heating element.

f. Coupled resistor and capacitor. Coupled in parallel with LOW/HIGH thermostat and override thermostat, and provide an RC time delay to keep the temperature of the heating element from changing too fast when the LOW/HIGH thermostat setting is changed. They allow just enough power to reach the element to supply some heat but not enough to maintain the former temperature.

g. Override thermostat. Enables quick heat-up of wax coater by eliminating the effect of the coupled resistor and capacitor. It is closed during warm-up, providing a path for input of power to the element. It opens when minimum operating temperature has been reached and does not reclose.

h. Motor thermostat. Prevents power from being applied to the motor unless it senses the wax coater is at the proper temperature. It is normally open, but closes when the wax has reached proper operating temperature.

i. OPERATE pilot light. Coupled in parallel with the motor to indicate when the motor thermostat is closed and power can be applied to the motor.

j. AC motor. Turns coating roller via two gears and a toothed belt. Power is input to the motor via the motor thermostat and MOTOR switch.

4-3.2 Coating System. Transports material through the wax coater and coats one side with adhesive wax. It is composed of the following components.

Top Pressure Roller

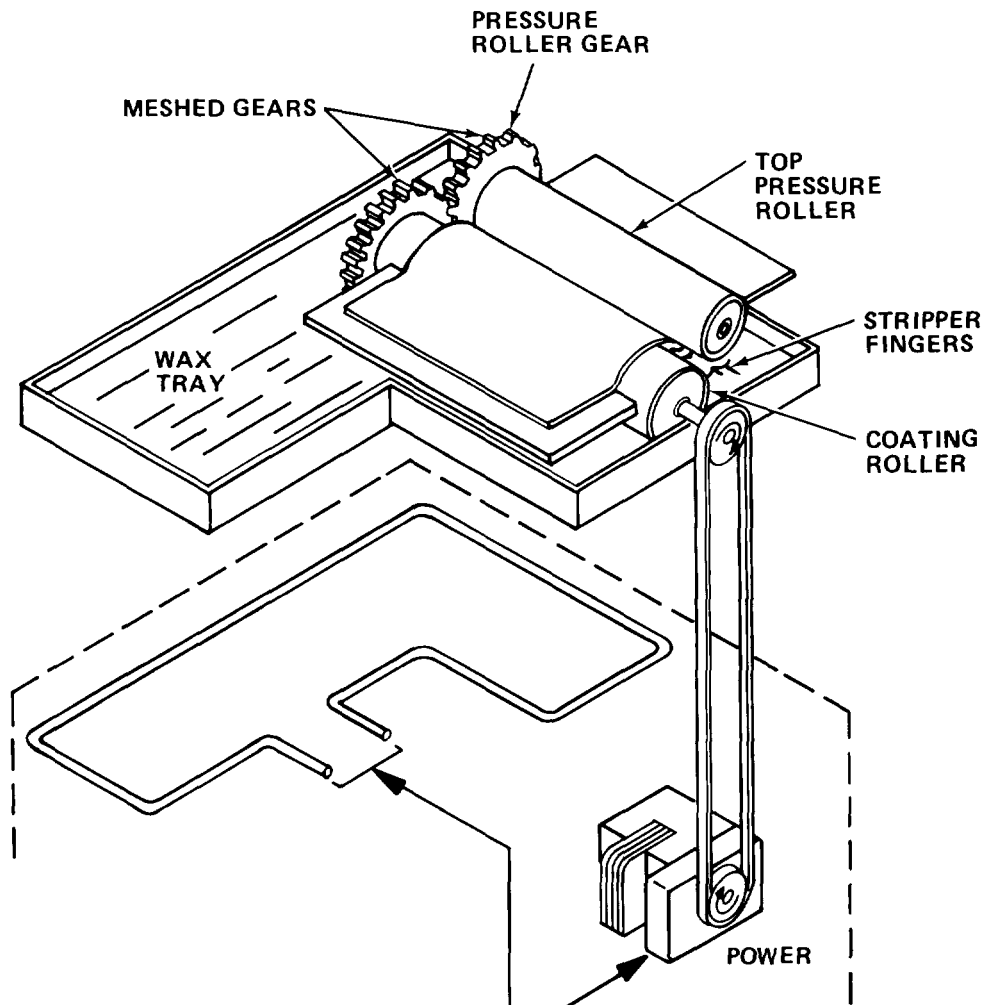
Coating Roller

Wax Tray

Stripper Fingers

Pressure Roller Gear

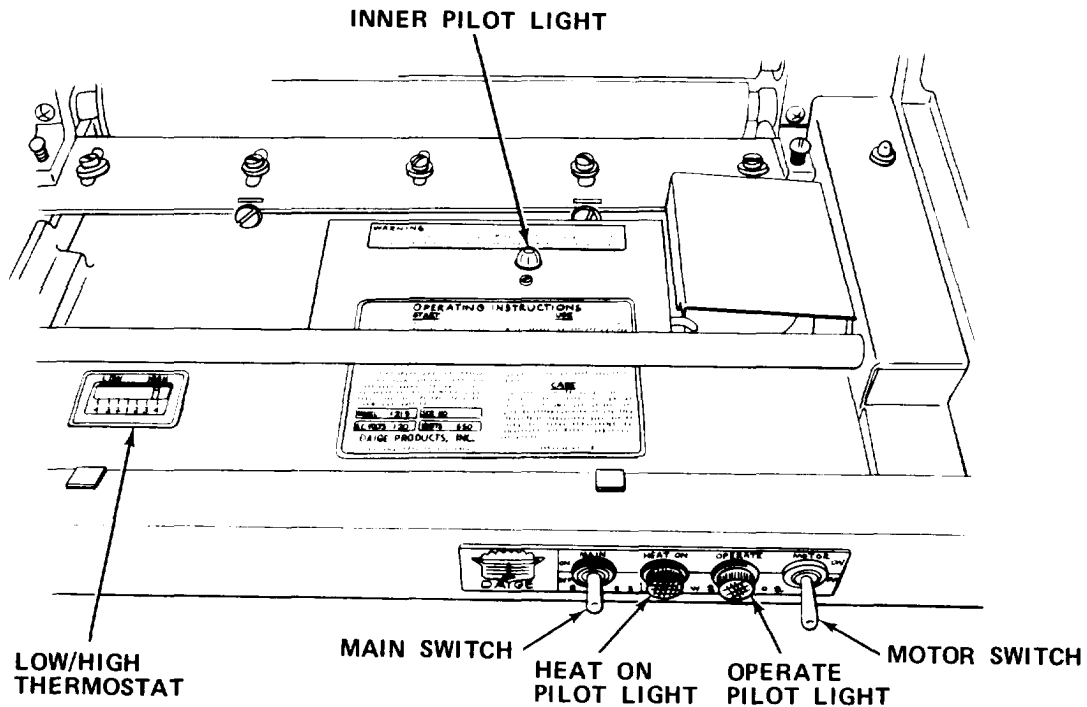
Meshed Gears



- a. Top pressure roller. Main transport and drive roller. It applies pressure on material fed between the rollers so that frictional force will pull material through as the rollers turn.
- b. Coating roller. Applies coating to the underside of the material as it goes by. Roller is partially submerged in wax.
- c. Wax tray. Holds wax and transfers heat from the heating element to the wax.
- d. Stripper fingers. Rest against top of the coating roller to peel material and prevent it from wrapping around the coating roller.
- e. Pressure roller gear. Connects to the ac motor via a toothed belt and drives the top pressure roller.
- f. Meshed gears. Drives the coating roller through a small toothed gear mounted on the top rollers. Transmits rotation of the top pressure directly to a larger gear mounted on the coating roller.

Section II OPERATING INSTRUCTIONS

4-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.



Control or Indicator

Function

Inner Pilot Light

Indicates when wax tray's heating element is on.

MOTOR switch

Applies power to roller motor. When wax coater has reached proper operating temperature, rollers rotate.

OPERATE Pilot Light

Amber light indicates wax coater has reached proper operating temperature and MOTOR switch can be turned ON.

Control or Indicator	Function
HEAT ON Pilot Light	Red light indicates that MAIN switch has been turned ON.
MAIN switch	Controls main power input.
LOW/HIGH Thermostat	Adjusts temperature of wax.

#### 4-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.

b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.

c. After You Operate. Be sure to perform your after (A) PMCS.

d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

##### 4-5.1 PMCS Procedures.

a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.

b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.

c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.

d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.

e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

g. Interval columns. This column determines the time period designated to perform your PMCS.

h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Adhesive Wax, (Item 25, Appendix E)	5 bars
Wax Solvent, (Item 26, Appendix E)	ar
Plastic Utility Pail	1 ea
Cheesecloth, (Item 5, Appendix E)	ar
Rubber Hand Scraper	1 ea
Flat Tip Screwdriver	1 ea



Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

**NOTE**

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment is Not Ready/ Available If:
1	B	<p><b><u>ADHESIVE WAX COATER</u></b></p> <p><u>Inspect.</u></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Do not attempt to move machine when wax is melted and machine is on or damage to machine may result.</p>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
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AN - Annually  
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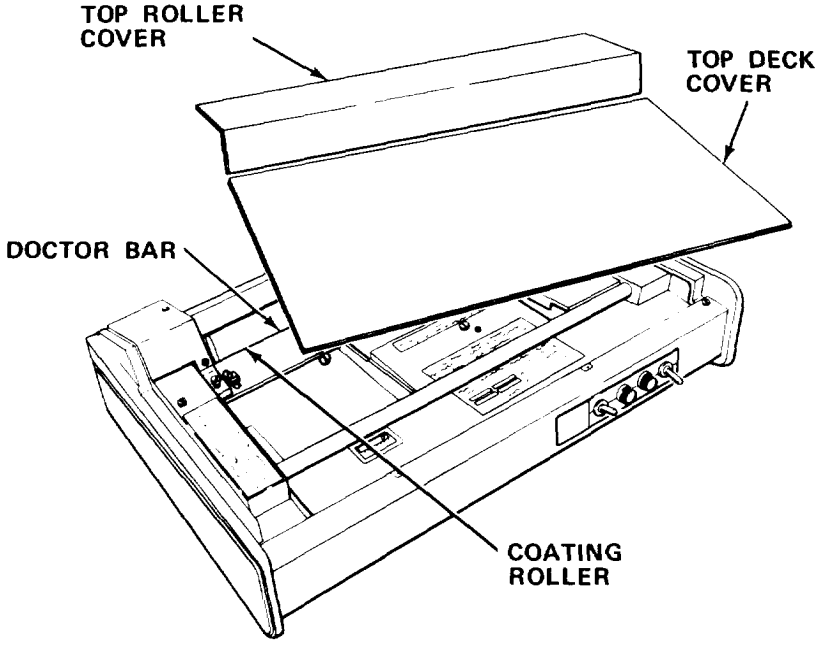
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><b>ADHESIVE WAX COATER - Cont</b></p> <p><u>Inspect - Cont</u></p>  <p>1. Unplug machine and remove top roller cover and top deck cover.</p> <p>2. Inspect doctor bar and coating roller for dust, dirt, or foreign particles. If dirty, clean with wax solvent.</p>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
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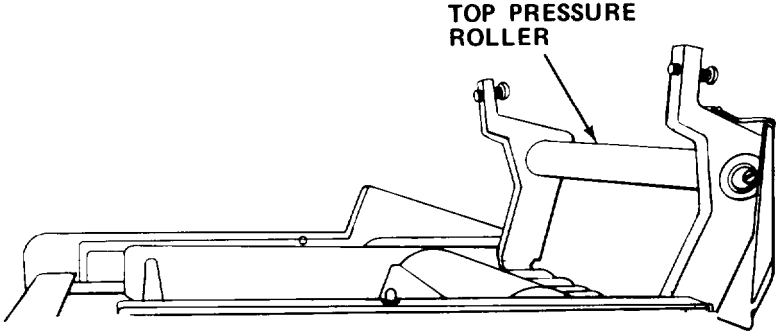
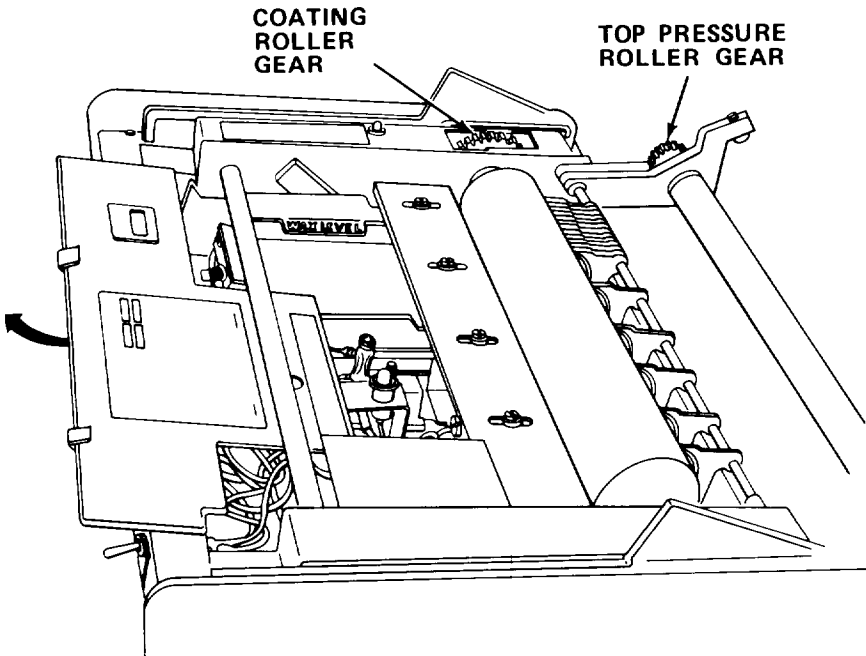
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><u>ADHESIVE WAX COATER - Cont</u></p> <p><u>Inspect - Cont</u></p>  <p>3. Lift top pressure roller. Inspect for dust, dirt, or foreign particles. If dirty, clean with wax solvent.</p> 	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
<b>ADHESIVE WAX COATER - Cont</b>			
I	B	<p><u>Inspect - Cont</u></p> <p>4. Inspect pressure roller gear and coating roller gear for chipped or broken teeth.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>When moving inner panel, keep back end lifted so it does not catch on pilot light, or damage to light can result.</p> <p>5. Remove screw holding inner panel. Grasp back of inner panel, lift, and pull it toward rollers. When inner panel is free of mounting brackets, lift its back above pilot light and slide inner panel out front of wax coater.</p> <div style="text-align: center;"> <p>MOTOR</p> <p>CAPACITOR AND TERMINAL BLOCKS</p> <p>SWITCHES</p> </div> <p>6. Inspect electrical components for loose connections. Tighten if necessary.</p>	<p>Damaged gears.</p>

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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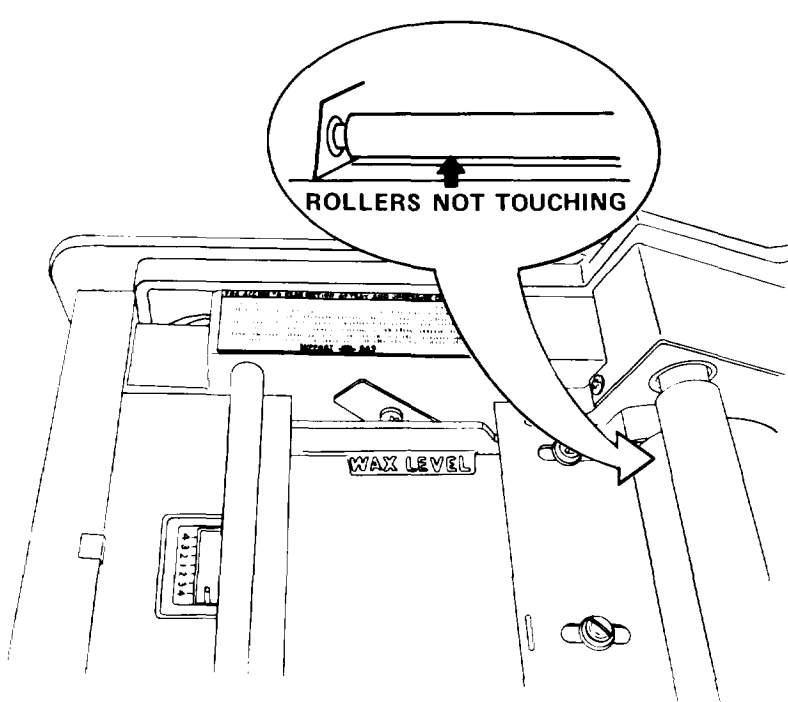
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><b>ADHESIVE WAX COATER - Cont</b></p> <p><u>Inspect - Cont</u></p> <ol style="list-style-type: none"> <li>7. Inspect wax in wax tray for suspended dust, dirt, or foreign matter.</li> <li>8. Reinstall inner panel.</li> </ol>  <ol style="list-style-type: none"> <li>9. Reinstall top pressure roller. Examine gap between top pressure roller and coating roller to be sure they are not touching at any point. Adjust as necessary (paragraph 4-10.2).</li> <li>10. Reinstall top roller cover and top deck cover, and plug in power cord.</li> </ol>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
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W - Weekly  
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(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
2	W	<u>ADHESIVE WAX COATER - Cont</u>	
		<p><u>Clean Coating Roller.</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>Serious injury may result if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.</p> <ol style="list-style-type: none"> <li>1. Remove top roller cover and top deck cover.</li> <li>2. Turn MAIN switch ON.</li> <li>3. Grasp top pressure roller and lift back. Check that top pressure roller is clean.</li> <li>4. When OPERATE pilot light comes on, turn MOTOR switch ON.</li> </ol>	

**Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont**  
 B - Before  
 D - During  
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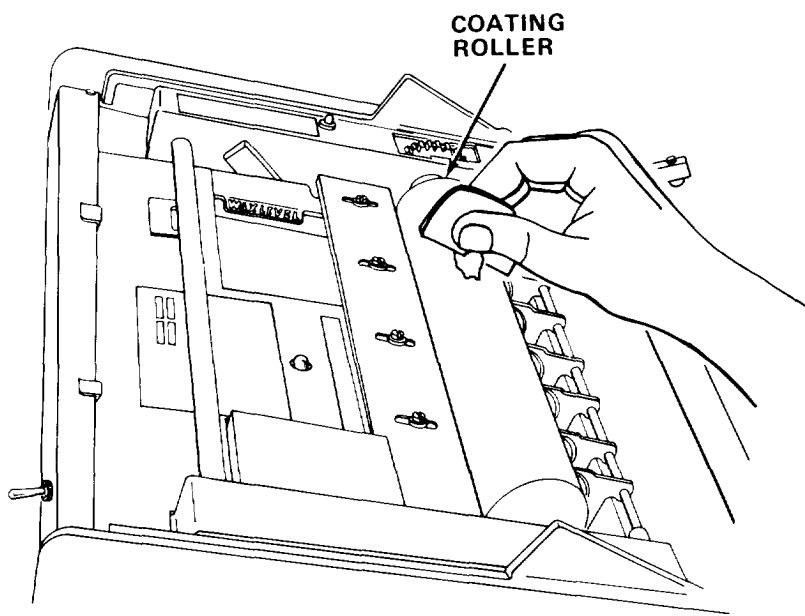
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
<b>ADHESIVE WAX COATER - Cont</b>			
2	W	<p><u>Clean Coating Roller - Cont</u></p>  <p>                     5. Press scraper on top of coating roller at one end, and scrape across top of roller as it rotates. Repeat until only clean, clear wax is collected. Check that wax in tray is at correct level.                      6. Reinstall top pressure roller.                      7. Reinstall top deck cover. If wax coater is not to be operated, reinstall top roller cover.                      8. Turn MAIN switch and MOTOR switch OFF if machine is not to be used immediately.                 </p>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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(Number) - Hundreds of Hours

ITEM NO.	INTER-VAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
3	D	<p><u>ADHESIVE WAX COATER - Cont</u></p> <p><u>Clean Top Pressure Roller.</u></p> <p style="text-align: center;"><u>WARNING</u></p> <p>Serious injury may result if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.</p> <ol style="list-style-type: none"> <li>Remove top roller cover and top deck cover.</li> <li>Turn roller motor ON.</li> </ol>	



Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

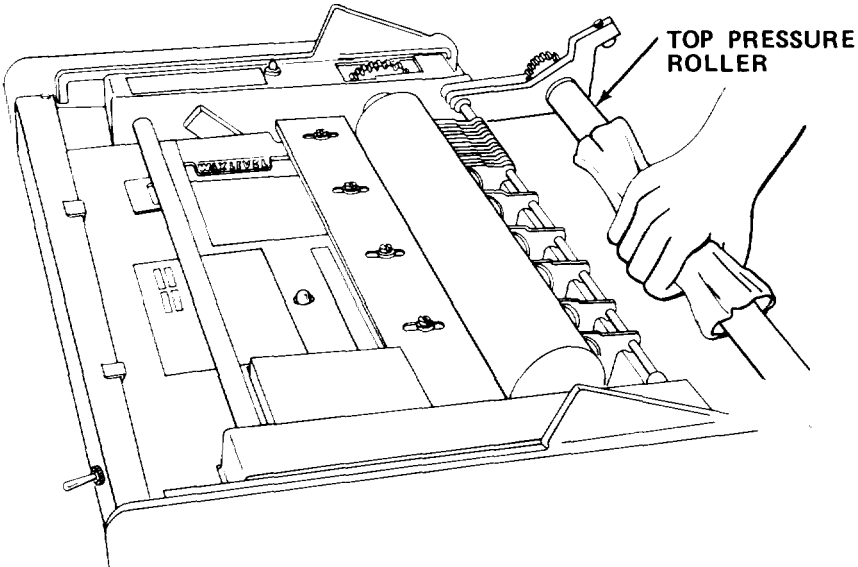
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
3	D	<u>ADHESIVE WAX COATER - Cont</u>	
		<p><u>Clean Top Pressure Roller - Cont</u></p> <ol style="list-style-type: none"> <li>3. Scrape off wax from top pressure roller with scraper.</li> <li>4. Turn roller motor OFF, and place top pressure roller in rear position.</li> </ol>  <ol style="list-style-type: none"> <li>5. Soak cheesecloth with wax solvent and wipe down surface of top pressure roller. Repeat until all wax and dirt has been removed. Allow roller to dry.</li> <li>6. Place top pressure roller in original position. Check that it is not touching coating roller at any point. Adjust if necessary (paragraph 4-10.2).</li> <li>7. Reinstall top deck cover. Reinstall top roller cover if machine is not to be operated immediately.</li> </ol>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN . Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
4	W	<u>ADHESIVE WAX COATER - Cont</u>	
		<p><u>Drain Wax and Clean.</u></p> <p style="text-align: center;"><u><b>WARNING</b></u></p> <p>Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.</p> <p style="text-align: center;"><u><b>CAUTION</b></u></p> <p>When draining, do not lift front of wax coater more than 1 in. or liquid wax will spill inside of machine.</p> <ol style="list-style-type: none"> <li>1. Plug ac power cord into electrical outlet. Turn MAIN switch ON.</li> <li>2. Remove top deck cover and top roller cover.</li> </ol>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

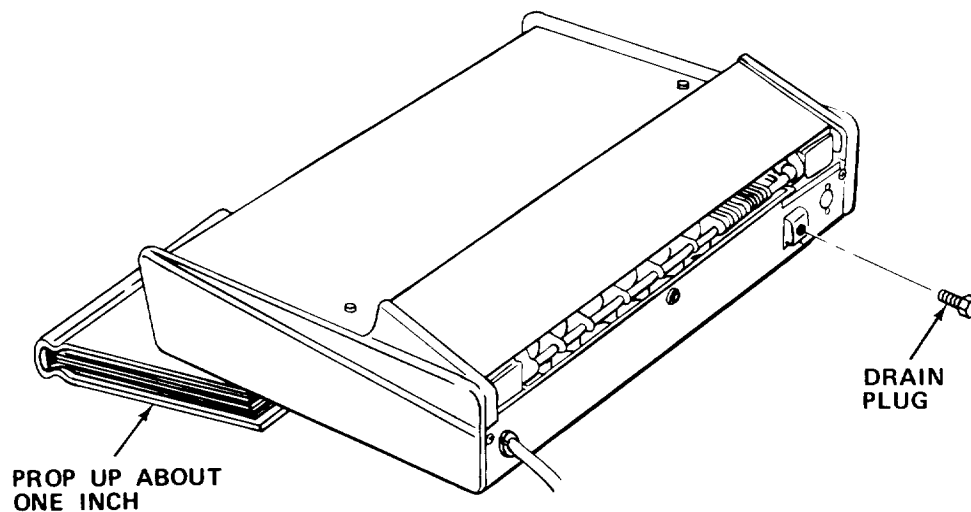
B - Before  
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(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
4	W	<p><u>ADHESIVE WAX COATER - Cont</u></p> <p><u>Drain Wax and Clean - Cont</u></p>	



3. When wax is completely liquid (melted), place disposable pail, with capacity of at least 1 qt, beneath drain hole.
4. Remove drain plug at rear of wax coater. Raise front of wax coater slightly and let wax drain completely.
5. Turn MAIN switch OFF while wax is draining. When all wax has drained, replace drain plug.
6. Restore wax coater to level position.
7. Remove ac power cord from outlet.

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

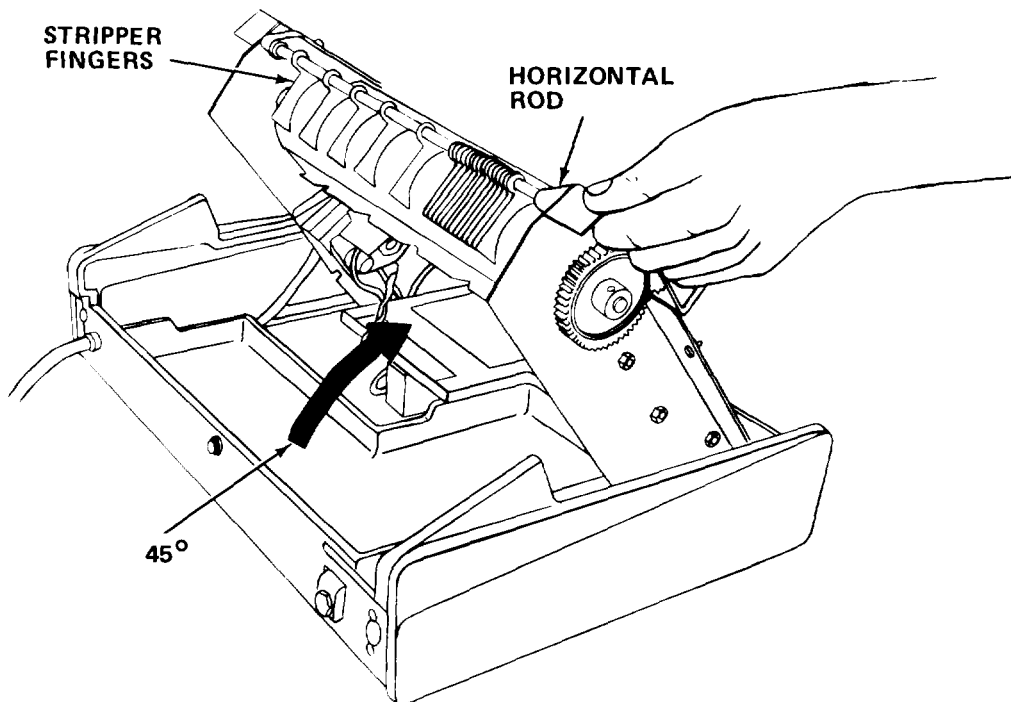
B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
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AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
4	W	<p><u>ADHESIVE WAX COATER - Cont</u></p> <p><u>Drain Wax and Clean - Cont</u></p>	



- Grasp horizontal rod that supports stripper fingers, and pull entire roller carriage assembly upward until carriage is at approximate 45 degree angle with base.

**NOTE**

Carriage assembly is hinged at front.

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
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W - Weekly  
M - Monthly  
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AN - Annually  
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(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
4	w	<p><b>ADHESIVE WAX COATER - Cont</b></p> <p><u>Drain Wax and Clean - Cont</u></p> <div style="text-align: center;"> <p>The diagram shows a cross-section of the wax coater's carriage assembly. A horizontal rod is labeled 'CARRIAGE SUPPORT BAR' with a leader line pointing to it. Below this rod, a horizontal line is labeled 'WAX LEVEL'. The assembly includes various rollers, a doctor bar, and a pressure roller. A control panel with a 'RESET' button is visible on the left side.</p> </div> <ol style="list-style-type: none"> <li>9. Lower carriage slowly until carriage support bar on left side engages.</li> <li>10. Clean out paper and foreign matter from wax tray, coating roller, stripper fingers, and between doctor bar and coating roller.</li> <li>11. Soak piece of cheesecloth in wax solvent, and clean out wax tray, coating roller, pressure roller, and doctor bar.</li> <li>12. Break up five bars of new wax and place in wax tray.</li> <li>13. Grasp horizontal rod and lift slightly to disengage carriage support bar. Tilt support bar out of way and gently lower carriage on top of wax.</li> </ol>	

Table 4-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
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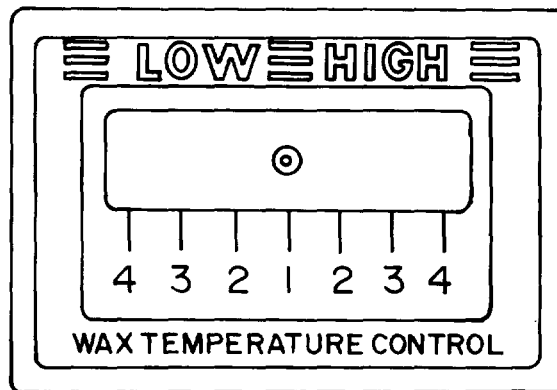
(Number) - Hundreds of Hours

ITEM NO.	INTER-VAL	ITEM TO BE INSPECTED	For Readiness Reporting, Equipment Is Not Ready/ Available If:
		PROCEDURE	
4	W	<u>ADHESIVE WAX COATER - Cont</u>	
		<u>Drain Wax and Clean - Cont</u>  14. Plug in ac power cord and turn MAIN switch ON. Allow wax to melt and roller assembly to seat itself. Press down firmly on roller assembly when wax has melted to seat roller.  15. Reinstall top deck cover. If wax coater is not to be used, reinstall top roller cover.	

4-6. OPERATION UNDER USUAL CONDITIONS.

4-6.1 Operating Procedures.

- a. Place wax coater on firm, level surface. Plug power cord into grounded ac outlet.
- b. Lift up top deck cover.



**NOTE**

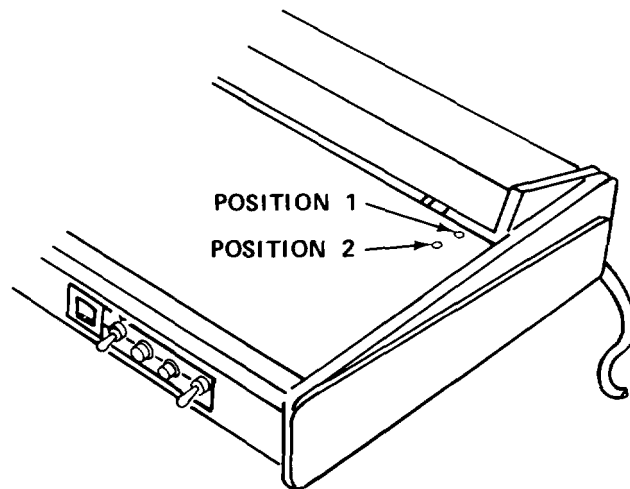
The lighter the material, the lower the temperature should be set to prevent bleed-through. The higher the temperature, the greater the possibility of bleed-through.

- c. Set LOW/HIGH thermostat to 1 position if material to be coated is normal-weight stock. If material is lightweight, set thermostat lower.

**CAUTION**

If wax level is allowed to fall below mark, damage to machine may result.

- d. Check wax level in tray. Add piece of wax if below level indicator.



- e. Position top deck cover on wax coater by placing cover holes over pins. If coating lightweight or normal weight stock, place cover all the way forward (position 1). For heavier materials, place cover back one hole (position 2).

f. Turn MAIN switch ON. If HEAT ON pilot light does not come on, refer to troubleshooting procedures.

- g. Allow time for wax to melt, approximately 15 to 18 min.

4-6.2 Operating Instructions on Decals and Instruction Plates.

# OPERATING INSTRUCTIONS

## START

MACHINE MUST BE ON A LEVEL SURFACE. PLUG THE POWER LINE CORD INTO AN A.C. GROUNDED OUTLET. THE SWITCH ON THE LEFT HAND SIDE CONTROLS THE HEATER TO MELT THE WAX. THE RED, ADJACENT PILOT LIGHT WILL GLOW WHEN THIS SWITCH IS ON. IN APPROXIMATELY 20 MINUTES THE AMBER LIGHT WILL GLOW, INDICATING THAT THE WAX IS AT OPERATING TEMPERATURE. THE MACHINE IS THEN READY FOR USE. THROW THE RIGHT HAND SWITCH "ON" TO ACTIVATE THE MOTOR AND COATING ROLLER. (NOTE: MOTOR WILL NOT OPERATE UNTIL THE AMBER LIGHT GOES ON.

MODEL 1215	SER. NO. IZ 787
A. C. VOLTS 120	WATTS 650

## USE

WITH MOTOR RUNNING, PLACE MATERIAL TO BE COATED ON THE DECK OF THE MACHINE WITH PRINTED MATTER FACE UP GENTLY PUSH MATERIAL FORWARD UNTIL IT IS CAUGHT BY THE ROLLERS. ADHESIVE WAX COAT WILL BE APPLIED AS MATERIAL PASSES THROUGH THE MACHINE. TURN OFF MOTOR SWITCH AFTER PROCESSING MATERIAL. HEATER SWITCH SHOULD BE LEFT ON DURING THE DAY WHILE MACHINE IS IN USE.

## CARE

KEEP WAX LEVEL UP TO THE MARKER ADD WAX WHEN NECESSARY. DO NOT MOVE MACHINE WHILE WAX IS HOT. SET HI-LO THERMOSTAT CONTROL AT MID-POINT UNLESS IT IS DESIRED TO HAVE WAX AT HIGHER OR LOWER TEMPERATURE. FOR ADJUSTMENTS AND FURTHER INSTRUCTIONS SEE MANUAL.

- WARNING:** MACHINE WILL NOT OPERATE PROPERLY UNLESS WAX LEVEL IS UP TO THE MARKER IN TRAY
- DO NOT MOVE MACHINE WHILE WAX IS LIQUID•

### FOR ACCESS TO REAR SECTION OF TRAY AND UNDERSIDE OF DRUM

CARRIAGE MAY BE TILTED UPWARD WHEN WAX IS MELTED BY GRASPING ROD RUNNING ACROSS REAR OF MACHINE (USE GLOVE) AND PULLING UPWARD SEVERAL INCHES. THE CARRIAGE SUPPORT BAR, INDICATED BY ARROW BELOW, WILL SWIVEL INTO A VERTICAL POSITION TO HOLD THE CARRIAGE UPRIGHT AT AN ANGLE. TO RETURN CARRIAGE TO THE OPERATING POSITION, GRASP REAR ROD, ROTATE SUPPORT BAR TO ITS ORIGINAL ANGULAR POSITION AND SLOWLY LOWER CARRIAGE INTO TRAY.

SUPPORT  BAR

4-7. **OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.



**Section III OPERATOR MAINTENANCE**

**4-8. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**4-9. TROUBLESHOOTING PROCEDURES.**

a. The table lists the common malfunctions which may occur during the operation or maintenance of the adhesive wax coater, or its components. You should perform the test/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

**Table 4-2. TROUBLESHOOTING**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. WAX COATER DOES NOT WORK; WAX REMAINS COLD.	Step 1. Check to see if ac power cord is plugged into wall outlet.	(a) If cord is plugged in, proceed to step 2. (b) Plug cord into ac electrical outlet.
	Step 2. Check to see if outlet circuit breaker is tripped.	(a) If circuit breaker is on, refer to organizational maintenance. (b) Reset circuit breaker.
2. WAX COATING APPEARS FLAT AND DULL.	Step 1. Check wax level.	(a) If wax level is correct, proceed to step 2. (b) Break up new wax into small cubes. When OPERATE pilot light is lit, place wax cubes into tray until wax is at operating level.

**Table 4-2. TROUBLESHOOTING - Cont**

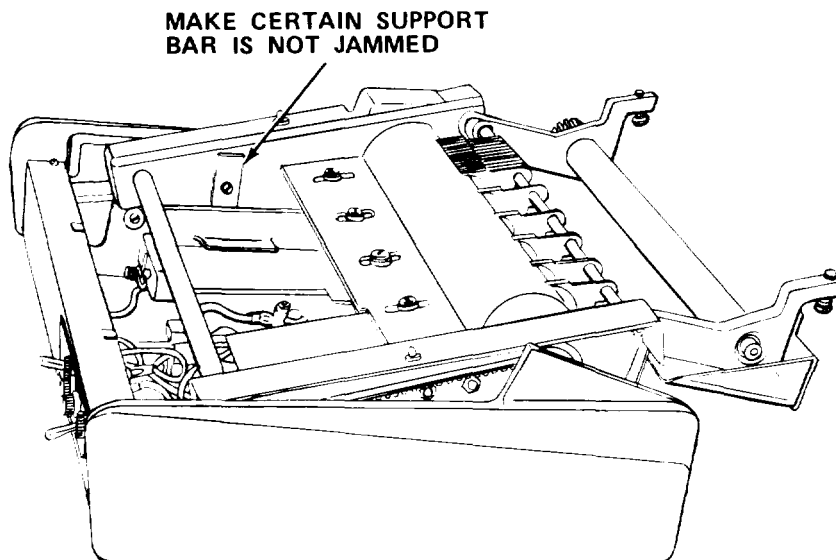
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. WAX COATING APPEARS FLAT AND DULL - Cont	Step 2. Check LOW/HIGH thermostat setting.	If in HIGH range, reduce setting one notch. Allow time for temperature to adjust. Repeat if malfunction persists.
3. WAX BLEEDS THROUGH SHEET.	Step 1. Check setting of LOW/HIGH thermostat.	(a) If in HIGH range, reduce setting one notch. Allow time for temperature to adjust.
<b>NOTE</b>		
If thermostat is set too low, machine will not operate correctly.		
(b) Run scrap piece of material through wax coater. If malfunction persists, repeat step (a) above until wax has stopped bleeding.		
(c) If unable to correct malfunction, proceed to step 2.		
Step 2. Check to see if wax is too thick.		
Refer to malfunction 4, steps 1 and 2.		
4. COATING LAYER IS TOO THICK OR TOO THIN.	Step 1. Visually examine clearance between doctor bar and coating roller to see if gap appears uneven, too small, or too large.	(a) If gap appears correct, proceed to step 2.
(b) Adjust doctor bar gap (paragraph 4-10.1)		

Table 4-2. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

## 4. COATING LAYER IS TOO THICK OR TOO THIN - Cont

Step 2. Check that coating roller is seated properly in wax and carriage support bar is not jammed.



Push down on both ends of coating roller. Free carriage support bar if jammed.

## 5. WAX COATING CONTAINS DUST PARTICLES OR DIRT.

Step 1. Check that wax in tray is clear and has no suspended matter.

(a) If wax is clear, proceed to step 2.

(b) Drain and replace wax.

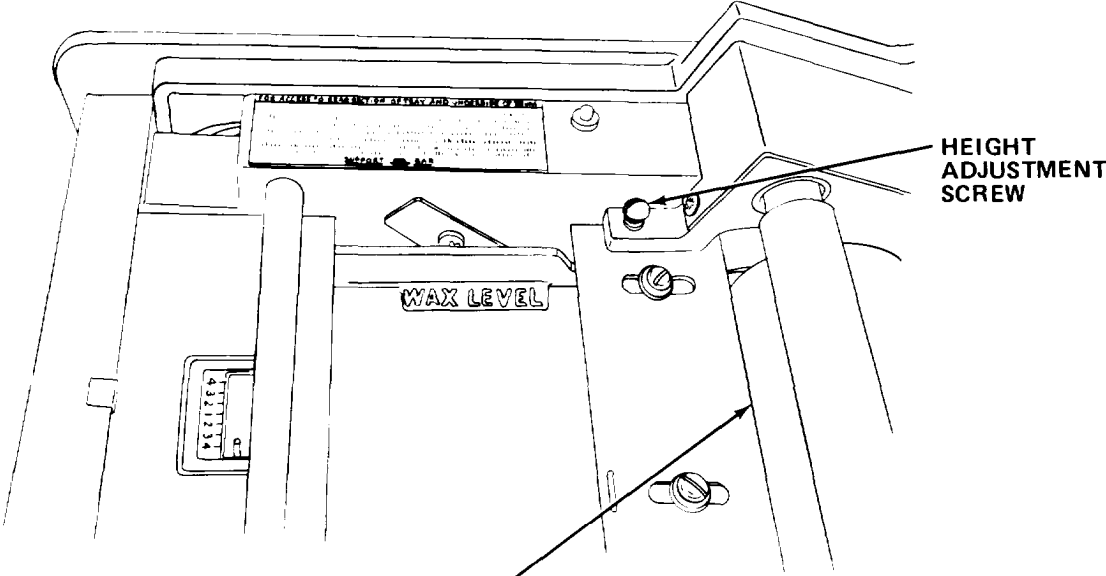
Step 2. Check that wax on coating roller is clear with no foreign particles.

Clean coating roller.

**Table 4-2. TROUBLESHOOTING - Cont**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. WAX COATING IS ROUGH, BUMPY, AND WAX FILAMENTS TRAIL FROM EDGE OF SHEET.	Step 1. Check setting of LOW/HIGH thermostat.	<ul style="list-style-type: none"> <li>(a) If in LOW range, increase setting one notch.</li> <li>(b) Allow time for temperature to adjust. Feed scrap piece of material through wax coater. Repeat this procedure until malfunction is corrected.</li> <li>(c) If unable to correct malfunction, proceed to step 2.</li> </ul>
	Step 2. Check that wax coater is level.	<ul style="list-style-type: none"> <li>(a) If wax coater is level, proceed to step 3.</li> <li>(b) Level wax coater.</li> </ul>
	Step 3. Check that carriage roller is seated firmly in wax tray and carriage support bar is not jammed.	<ul style="list-style-type: none"> <li>(a) If carriage support bar is free, proceed to step 4.</li> <li>(b) Free carriage support bar. Press down gently on both sides of carriage roller to seat firmly.</li> </ul>
	Step 4. Visually check gap between coating roller and doctor bar to be sure it is even.	Adjust gap clearance (paragraph 4-10.2).
7. WAX BUILDS UP ON TOP ROLLER, STRIPPER FINGERS, OR DOCTOR BAR.	Step 1. Check wax level in tray.	<ul style="list-style-type: none"> <li>(a) If wax level is correct, proceed to step 2.</li> <li>(b) Break up pieces of new wax into small cubes and drop into tray when OPERATE pilot light is on.</li> </ul>
	Step 2. Visually check gap between top pressure roller and coating roller to see if gap is too small or rollers are touching.	Adjust gap (paragraph 4-10.2).

Table 4-2. TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. MOTOR OR ROLLERS SHUT DOWN; MOTOR SWITCH IS ON.	Check to see if pilot lights are on.	If not, refer to malfunction 1, step 1.
9. ROTATION OF TOP ROLLER IS NOT UNIFORM.	Step 1. Check that top pressure roller is seated and side supports are resting on doctor bar.	 <p><b>MAKE CERTAIN THAT SEATING OF PRESSURE ROLLER ON DOCTOR BAR IS NOT OBSTRUCTED</b></p>
	(a) If roller is seated, proceed to step 2.	
	(b) Lift roller and clear any objects under side supports. Seat top pressure roller.	
	Step 2. Check that pressure roller gap is not excessive.	If too great, adjust roller gap (paragraph 4-10.2).

**4-10. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering operator maintenance functions for the adhesive wax coater. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Adjust Doctor Bar. . . . .	4-10.1
Adjust Roller Gap. . . . .	4-10.2

4-10.1 Adjust Doctor Bar.

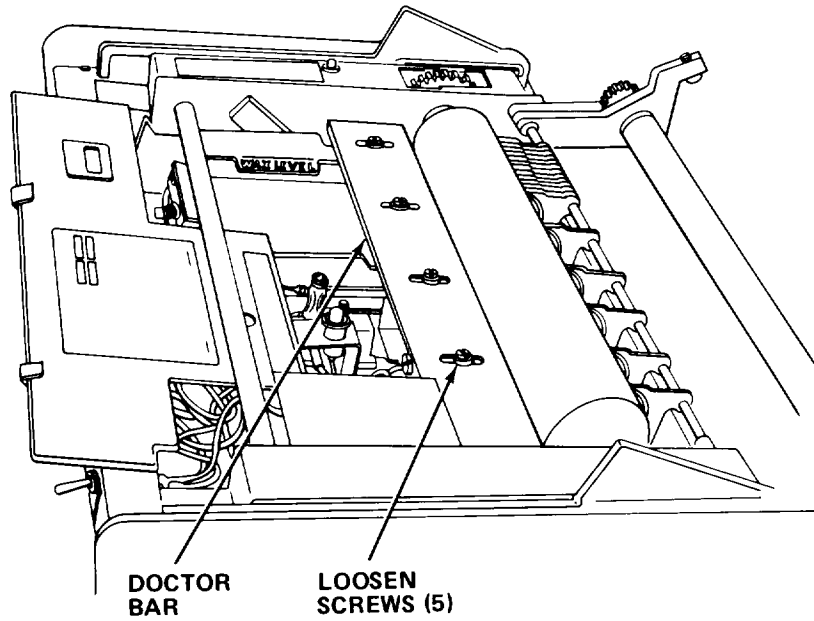
MOS: 81C, Cartographer

TOOLS: Thickness Gages 0.006 in. (2 required)  
Flat Tip Screwdriver  
Cross Tip Screwdriver

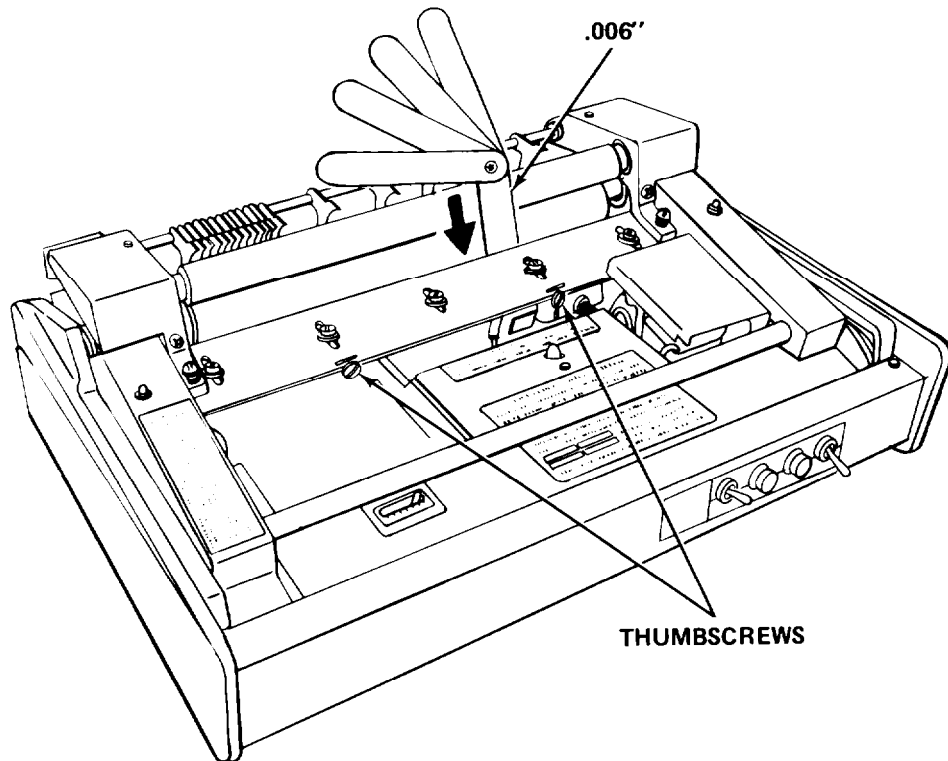
**WARNING**

Serious injury may result if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.

a. Lift off top deck cover and top roller cover.



b. Slightly loosen screws holding doctor bar.



c. Turn two brass, knurled thumbscrews at rear of doctor bar until blade moves away from drum slightly.

**NOTE**

If larger thickness of wax coating is desired, insert larger gage.

- d. Insert two 0.006 in. (0.150 mm) thickness gages between coating roller and doctor bar, approximately same distance apart as knurled adjusting screws.
- e. Slowly turn two knurled screws alternately until two thickness gages are pressed firmly against coating roller.

**NOTE**

Adjust doctor bar so that thickness gages are just snug against doctor bar and cooling roller.

- f. Pull thickness gages from between coating roller and doctor bar.
- g. Tighten doctor bar holding screws.
- h. Insert a thickness gage between coating roller and doctor bar.
- i. Move thickness gage across entire length of doctor bar to be sure gap is uniform and correct.
- j. Reinstall top deck cover and top roller cover.

4-10.2 Adjust Roller Gap.

MOS: 81C, Cartographer

TOOLS: Thickness Gage 0.040 in.  
Flat Tip Screwdriver  
Rubber Hand Scraper

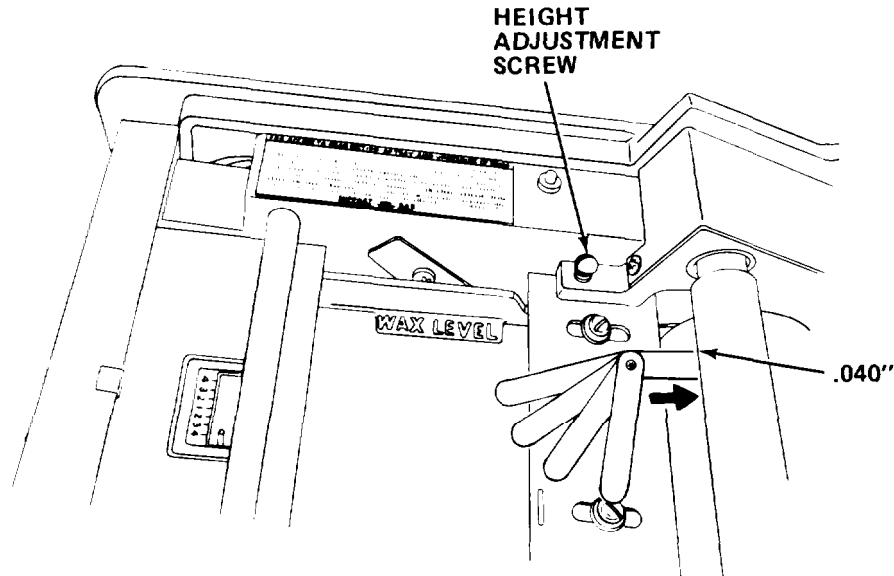
**WARNING**

Serious injury may result if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.

- a. Remove top roller cover and top deck cover.
- b. Check that top pressure roller is clean.
- c. Lift top pressure roller from wax machine.
- d. Scrape dry wax from top of roller.



- e. Reinstall top pressure roller.



- f. Insert 0.040 in. (1.02 mm) thickness gage between coating roller and top pressure roller at one end.

#### NOTE

Turning pressure screws to the right will raise top pressure roller.

- g. Turn height adjustment screw at that end until top pressure roller touches gage.
- h. Check that moving thickness gage in and out will turn top pressure roller.
- i. Check that thickness gage can be inserted easily.
- j. Insert thickness gage at other end and repeat steps g through i.
- k. Check uniformity of gap by inserting thickness gage between rollers at middle and moving in and out.
- l. If thickness gage cannot be inserted easily or top pressure roller does not move, repeat steps f. through k.
- m. Reinstall covers.

## Section IV ORGANIZATIONAL MAINTENANCE

**4-11. LUBRICATION PROCEDURES.** This equipment does not require lubrication.

**4-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.** These items are not used at the organizational level of maintenance.

**4-13. SERVICE UPON RECEIPT.**

4-13.1 Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with DA Pam 738-750.

c. Check to see if the equipment has been modified.

**4-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

**4-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.** If the adhesive wax coater does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power procedures for dead receptacle (Table 1-4). If power is present replace the adhesive wax coater.

**4-16. MAINTENANCE PROCEDURES.** There are no organizational maintenance procedures assigned for this equipment.

**4-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE****4-18. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

4-18.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-18.2 Special Tools: Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

4-18.3 Repair Parts. Repair parts for this equipment are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-321-24P covering direct/general support maintenance for this equipment.

4-19. DIRECT/GENERAL SUPPORT TROUBLESHOOTING PROCEDURES.

a. Direct/general support troubleshooting procedures cover the most common malfunctions that may be repaired at the direct/general support level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used at lower levels should be conducted in addition to the direct/general support troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the following schematic or the foldout located at the end of this manual for further fault analysis.

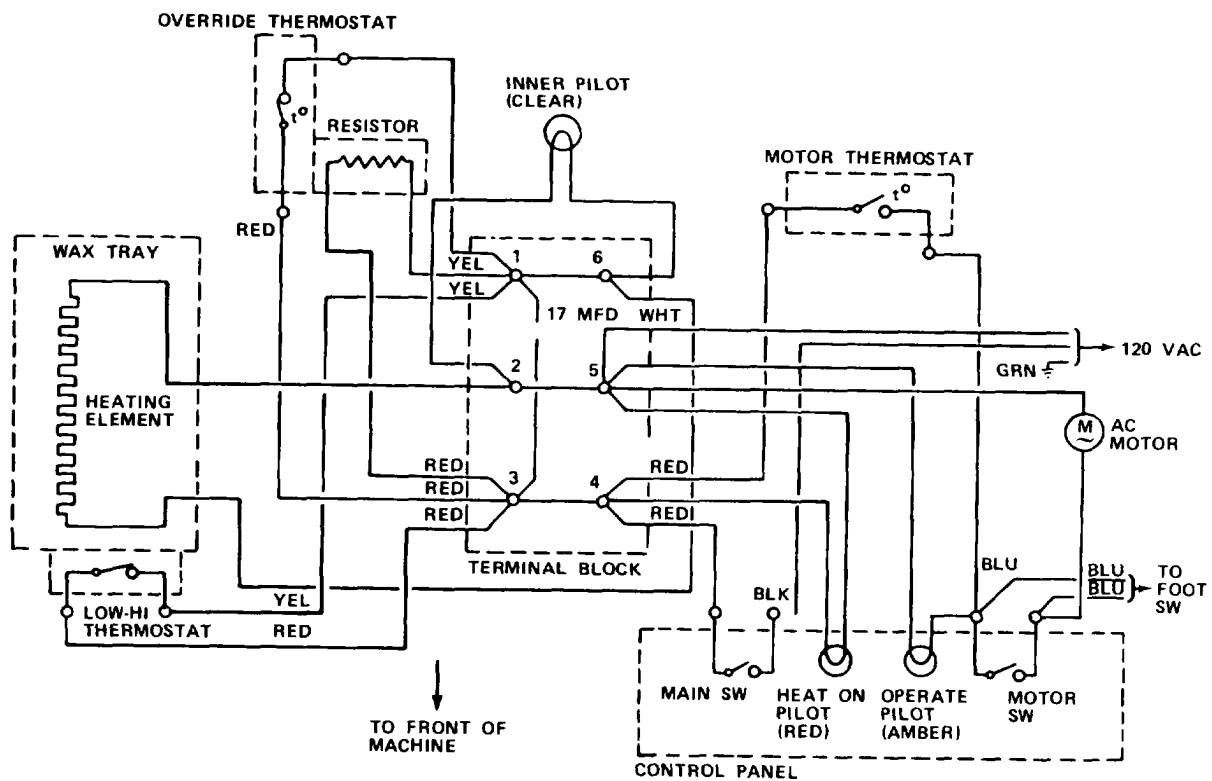


Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING

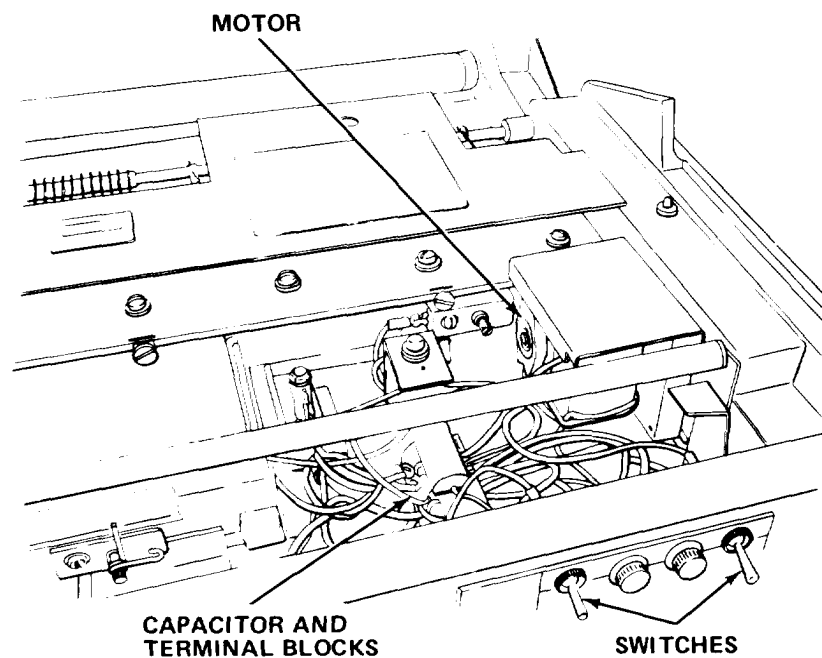
MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

## 1. WAX COATER IS INOPERATIVE.

Step 1. Remove covers and inner panel. Check visually for any loose electrical connections.

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- (a) If all wiring connections are tight, proceed to step 2.
- (b) Reconnect/repair any loose/damaged wiring according to wiring schematic.
- (c) Tighten any loose screws or nuts.

**Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont**

---

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

1. WAX COATER IS INOPERATIVE - Cont

**CAUTION**

Be sure that wax coater is unplugged before performing any continuity checks, or damage to meter may result.

Step 2. Check continuity through power cable.

(a) If continuity exists, proceed to step 3.

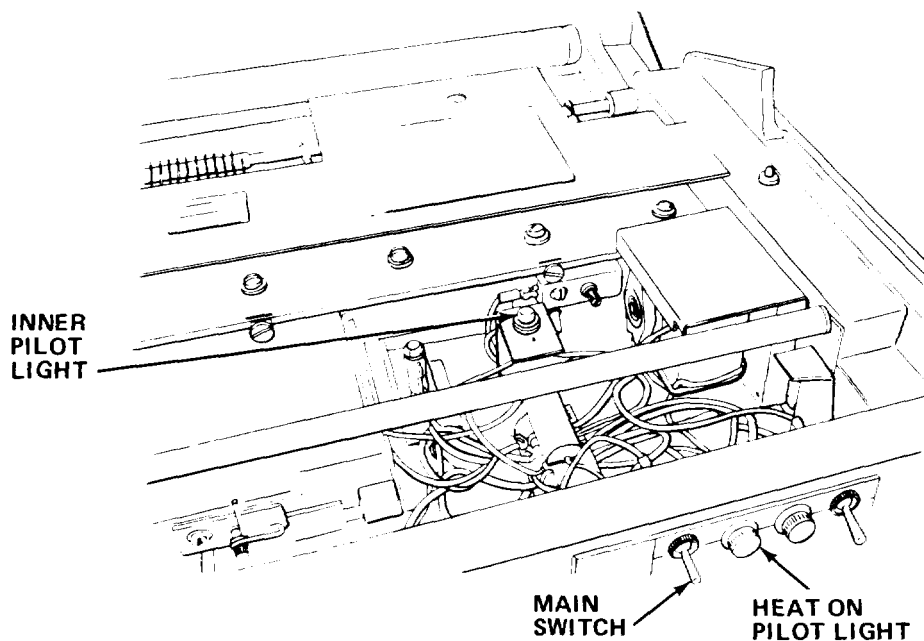
(b) If there is no continuity or continuity is intermittent, replace power cable (paragraph 4-20.9).

Step 3. Turn HEAT ON switch ON. Check for continuity across switch terminals.

Replace switch (paragraph 4-20.5).

Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
2. MAIN SWITCH, INNER PILOT LIGHT, AND HEAT ON PILOT LIGHT ARE ON; WAX REMAINS COLD.	Step 1. Remove covers and inner panel. Check visually for any loose electrical connections.	<p>(a) If wiring connections are good, proceed to step 2.</p> <p>(b) Reconnect/replace any loose or damaged wiring according to wiring schematic.</p> <p>(c) Tighten any loose screws and nuts.</p>



**Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont**

---

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

2. MAIN SWITCH, INNER PILOT LIGHT, AND HEAT ON PILOT LIGHT ARE ON; WAX REMAINS COLD - Cont

**CAUTION**

Be sure that wax coater is unplugged before performing any continuity checks, or damage to meter may result.

Step 2. Adjust override thermostat to 210° - 220°F.

If wax does not heat, proceed to step 3.

Step 3. Turn override thermostat fully to the right. Check for continuity across thermostat.

(a) If continuity is present, proceed to step 4.

(b) If there is no continuity across override thermostat, replace override thermostat (paragraph 4-20.6).

Step 4. Check for continuity through heating element.

If there is no continuity, replace heating element (paragraph 4-20.10).

3. WAX COATING APPEARS FLAT AND DULL.

Step 1. Turn override thermostat fully to the right. Check for continuity across thermostat.

(a) If continuity is not present, proceed to step 2.

(b) If there is continuity, replace LOW/HIGH thermostat (paragraph 4-20.6).

**CAUTION**

Do not attempt to move machine when wax is melted and machine is on or damage to machine may result.



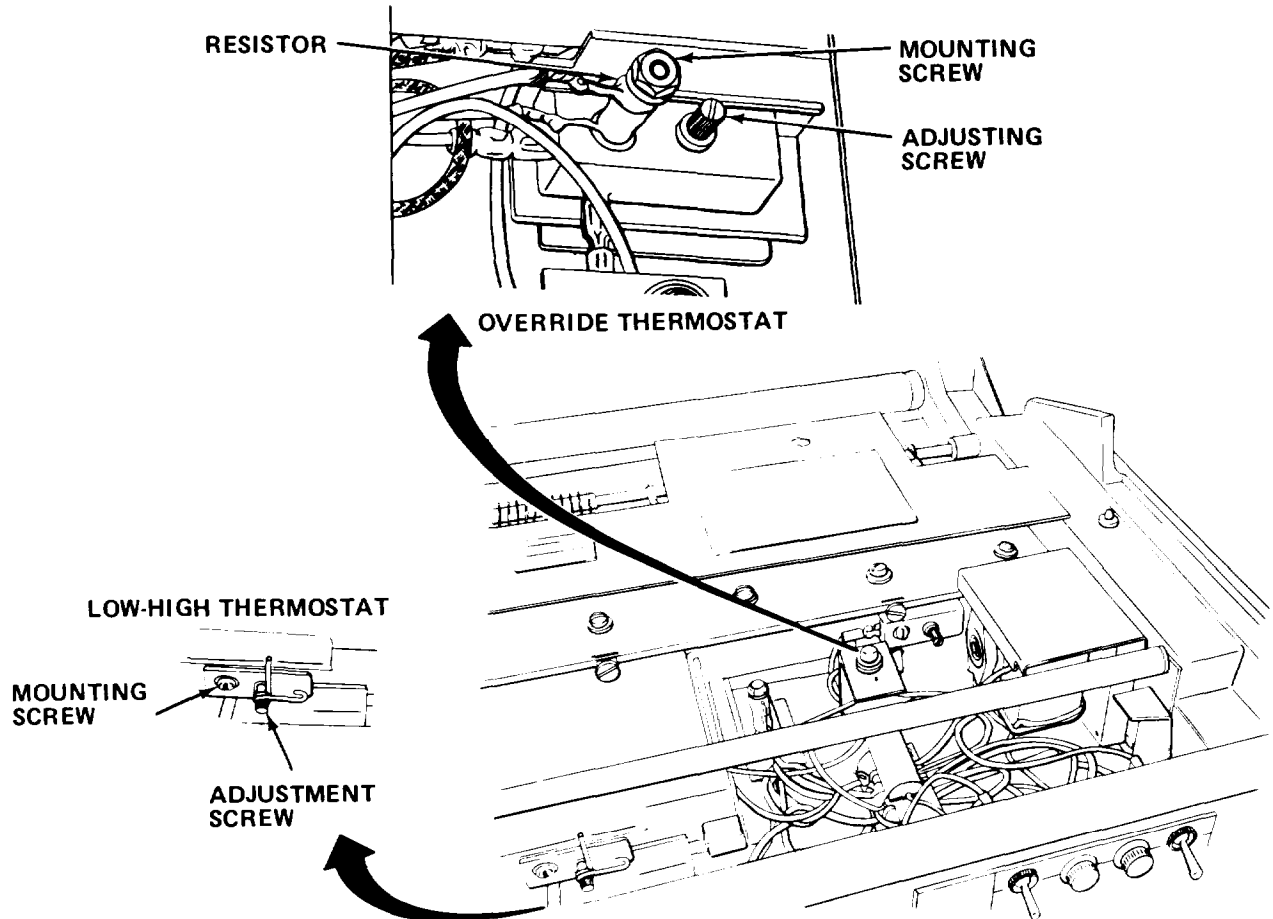
**Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont**

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

3. WAX COATING APPEARS FLAT AND DULL - Cont



Step 2. Turn HEAT ON switch OFF. Allow wax to cool. Turn HEAT ON switch back ON to see if inner pilot light comes on after normal warm-up period.

If light comes on, adjust override thermostat to 210° - 220°F (paragraph 4-20.7).

**Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont**

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

4. WAX COATING IS TOO THICK OR TOO THIN.  
Refer to malfunction 3, steps 1 and 2.
  
5. WAX WILL NOT HEAT COMPLETELY OR TAKES OVER 30 MIN TO MELT.  
Refer to malfunction 3, steps 1 and 2.
  
6. WAX COATING IS ROUGH AND BUMPY. WAX FILAMENTS TRAIL FROM EDGE OF SHEET.  
Refer to malfunction 3, steps 1 and 2.
  
7. WAX IS MELTED, BUT AMBER OPERATE PILOT LIGHT WILL NOT COME ON.  
Step 1. Turn MOTOR switch ON. Check to see if rollers rotate.
  - (a) If rollers rotate, lamp is bad. Replace lamp (paragraph 4-20.4).
  - (b) If rollers do not rotate, replace motor thermostat (paragraph 4-20.6).
  - (c) If malfunction is not corrected, proceed to step 2.

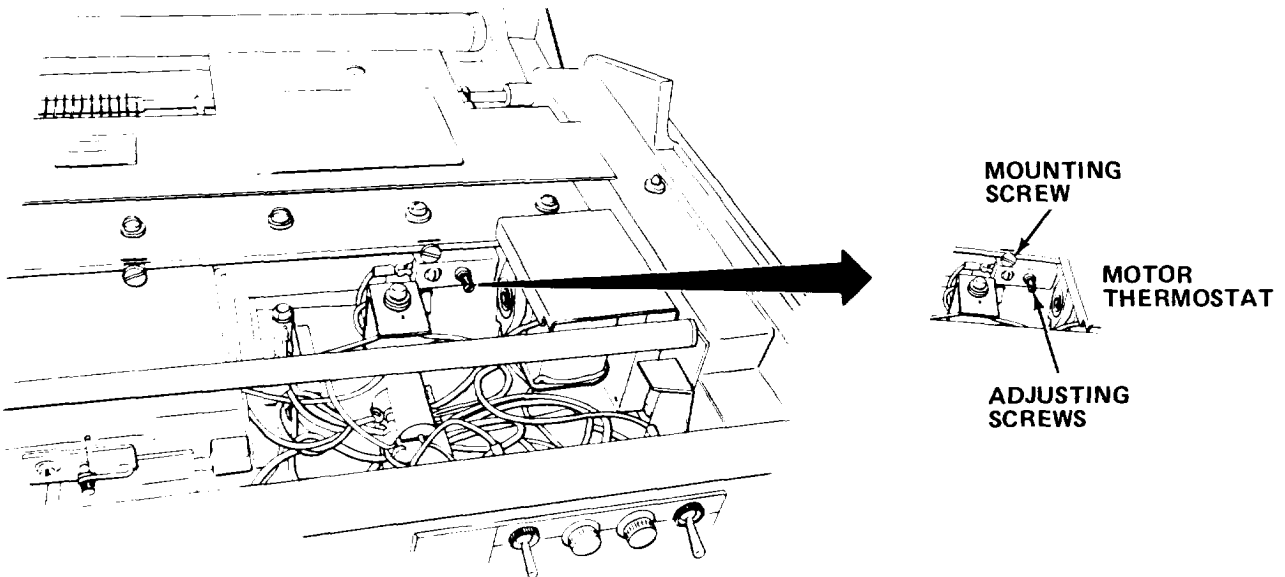
Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

## 7. WAX IS MELTED, BUT AMBER OPERATE PILOT LIGHT WILL NOT COME ON - Cont



Step 2. Check for continuity through amber OPERATE pilot light.

(a) If continuity is present, proceed to step 3.

(b) Replace operate pilot light (paragraph 4-20.4).

Step 3. See malfunction 3, step 2.

## 8. AMBER OPERATE PILOT LIGHT AND MOTOR SWITCH ARE ON, BUT ROLLERS DO NOT TURN.

Step 1. Check for continuity through MOTOR switch.

(a) If there is no continuity, replace MOTOR switch (paragraph 4-20.5).

(b) If there is continuity through MOTOR switch, replace motor (paragraph 4-20.1).

(c) If malfunction is not corrected, proceed to step 2.

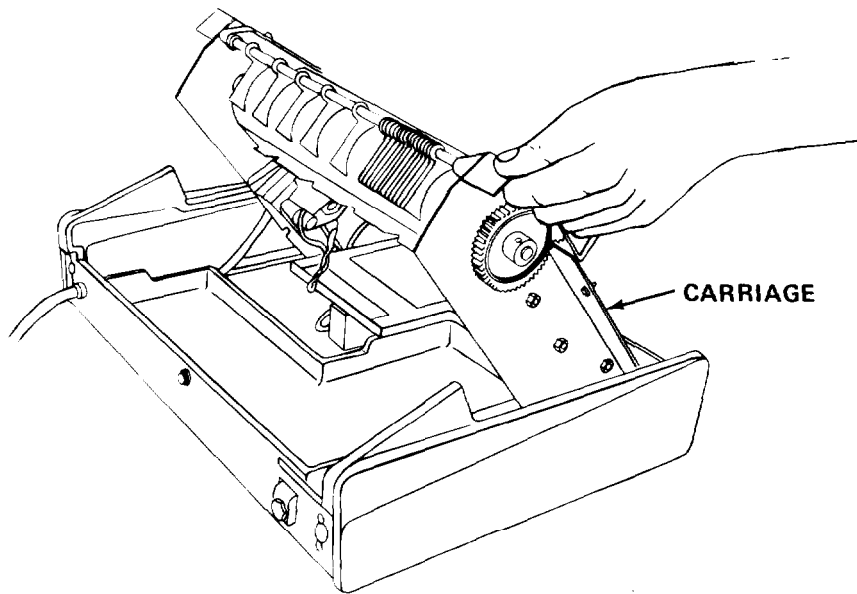
**Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont**

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

8. AMBER OPERATE PILOT LIGHT AND MOTOR SWITCH ARE ON, BUT ROLLERS DO NOT TURN  
- Cont



Step 2. Turn wax coater ON. When wax has melted, raise coating carriage and check tightness of drive belt.

(a) If belt tension is correct, proceed to step 3.

(b) If belt is broken or defective, replace drive belt. If loose, tighten drive belt (paragraph 4-20.8).

Step 3. Check pressure roller gear for damage or looseness.

Replace faulty pressure roller gear (paragraph 4-20.11).

Table 4-3. DIRECT/GENERAL SUPPORT TROUBLESHOOTING - Cont

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
9. MOTOR OR ROLLERS SHUT DOWN WITH MOTOR SWITCH ON.	Step 1. Check for vibration or humming of motor.	<ul style="list-style-type: none"> <li>(a) If motor is vibrating or humming, proceed to step 2.</li> <li>(b) If no vibration or humming is present, replace motor (paragraph 4-20.1).</li> <li>(c) If malfunction is not corrected, proceed to step 3.</li> </ul>
	Step 2. Raise carriage. Check to see if main gear, secondary gear, or pressure roller are jammed or stuck.	<ul style="list-style-type: none"> <li>(a) If free and clear of obstructions, proceed to step 3.</li> <li>(b) Remove obstacle.</li> </ul>
	Step 3. Check to see if gears are riding free.	<ul style="list-style-type: none"> <li>(a) If gears are free, proceed to step 4.</li> <li>(b) Replace gear (paragraph 4-20.11).</li> </ul>
	Step 4. Turn motor thermostat fully to the right, and check to see if motor comes on.	Adjust motor thermostat (paragraph 4-20.7).
10. ROTATION OF TOP PRESSURE ROLLER IS NOT UNIFORM.	Refer to malfunction 8, step 3.	

**4-20. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering direct/general support maintenance functions for the adhesive wax coater. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Motor . . . . .	4-20.1
Replace Capacitor . . . . .	4-20.2
Replace Resistor . . . . .	4-20.3
Replace Inner Pilot Light . . . . .	4-20.4
Replace Control Panel Switch(es). . . . .	4-20.5
Replace Thermostat(s) . . . . .	4-20.6
Adjust Thermostats . . . . .	4-20.7
Replace/Adjust Drive Belt . . . . .	4-20.8
Replace Power Cable . . . . .	4-20.9
Replace Heating Element . . . . .	4-20.10
Replace Gear . . . . .	4-20.11

4-20.1 Replace Motor.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Cross Tip Screwdriver  
Ball Peen Hammer  
Pin Punch

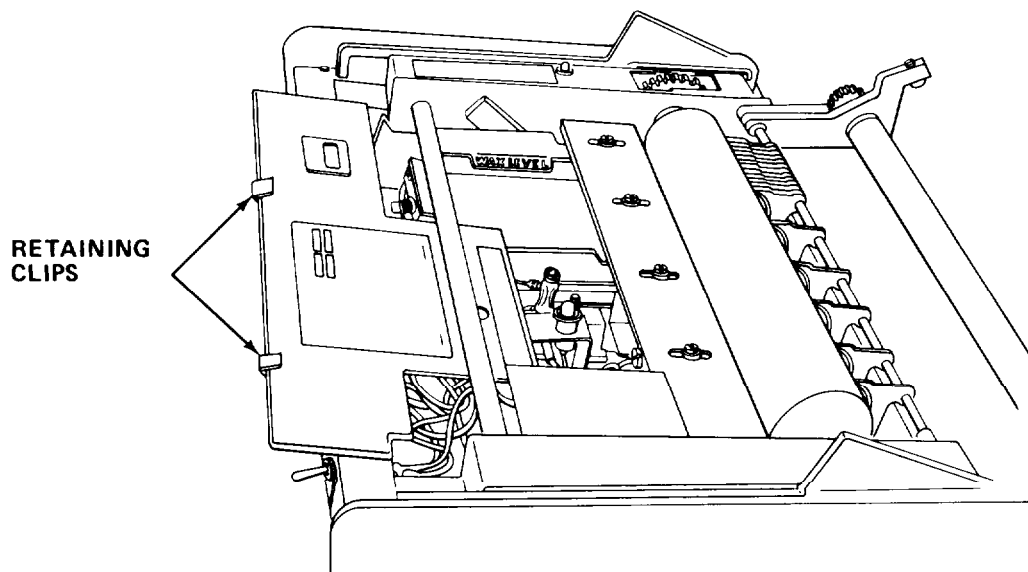
SUPPLIES: AC Motor

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.

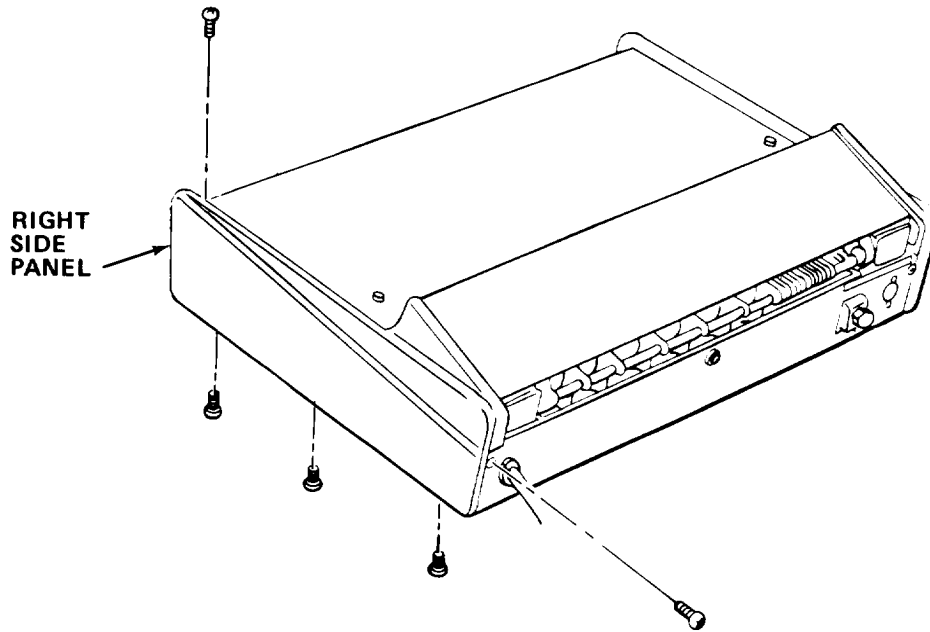
**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light, or damage to light may result.

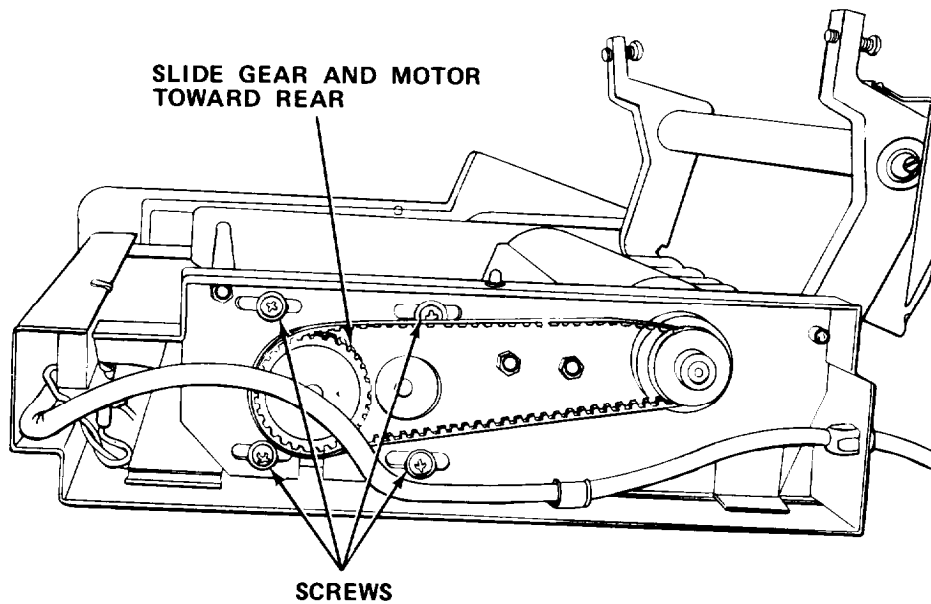


- c. Remove screw holding inner panel.

- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.
- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove.

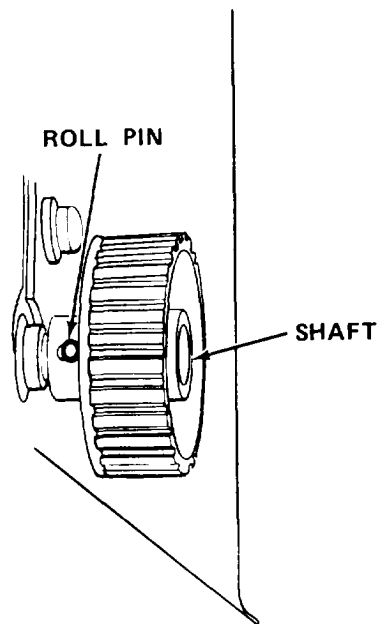


- g. Remove screws and right side panel.

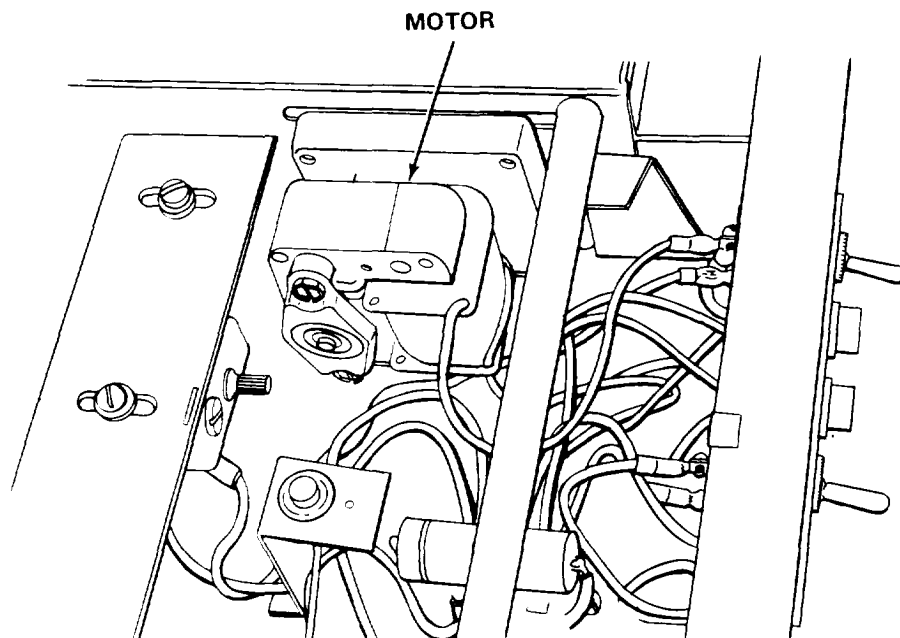


- h. Loosen screws and remove drive belt.
- i. Tighten screws.





- j. Remove roll pin attaching main gear to shaft. Slide main gear off shaft.
- k. Remove cover plate from top of motor.
- l. Tag and disconnect wires from terminal block.
- m. Remove mounting bolts and defective motor.



- n. Install new motor and secure with mounting bolts.
- o. Reconnect wires.

- p. Reinstall cover plate on top of motor.
- q. Slide main drive gear on shaft and insert roll pin.
- r. Loosen screws and reinstall drive belt. Tighten screws.

**CAUTION**

Do not tighten belt so tight that sudden stop by one of gears will stretch or snap belt.

- s. Slide motor away from secondary gear with one hand until belt is taut. Tighten one mounting screw.
- t. Check belt for tightness by trying to turn main gear while turning secondary gear.
- u. If belt slips over teeth, it is too loose. Repeat step s.
- v. Tighten remaining motor mounting screws.
- w. Reinstall right side panel.
- x. Reinstall inner panel.
- y. Reinstall top deck cover and top roller cover.

4-20.2 Replace Capacitor.

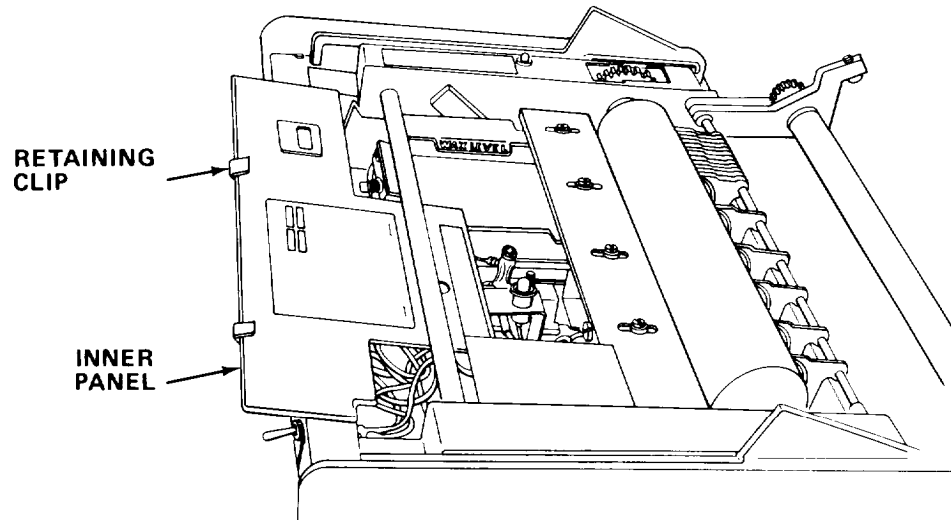
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: 47 MFD Capacitor (120 V)  
Insulation Sleeving

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.

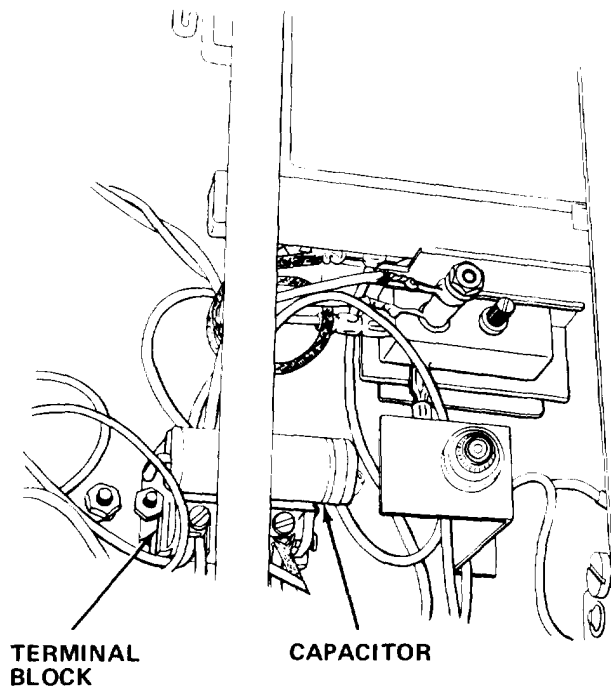


- c. Remove screw holding inner panel.
- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.

**CAUTION**

When moving inner panel, keep back end lifted so it does not catch on pilot light, or damage to light may result.

- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove.



**WARNING**

High voltages that are capable of causing death may be stored in capacitor after power is removed. Be sure capacitor is discharged and reduced to zero volts.

**CAUTION**

When attaching wires to terminal block, be sure that existing connections are not displaced.

- g. Move capacitor to one side and loosen screws in terminal block holding capacitor leads.
- h. Note position and polarity of capacitor.
- i. Remove defective capacitor.
- j. Place new capacitor in same position.
- k. Slip insulation sleeving over capacitor leads.
- l. Insert lead ends into terminal positions 1 and 3 on terminal block.
- m. Tighten screws.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light, or damage to light may result.

- n. Reinstall inner panel.
- o. Reinstall top deck cover and top roller cover.

**4-20.3 Replace Resistor.**

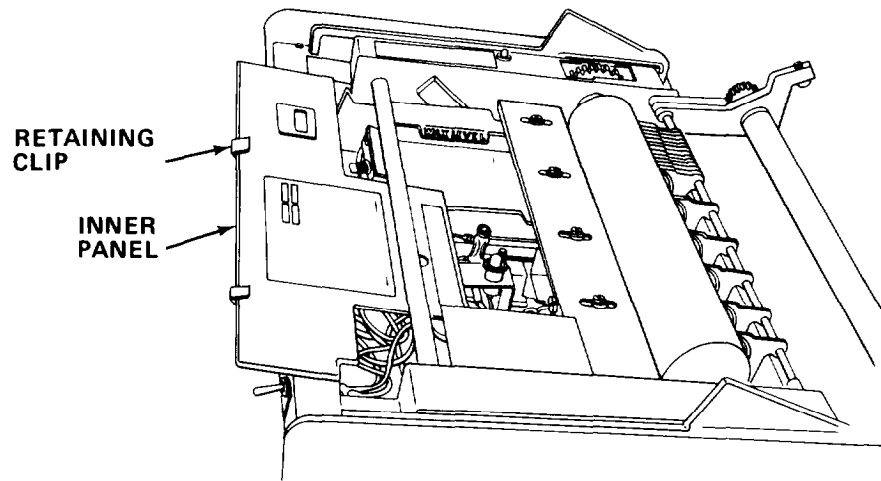
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Slip Joint Pliers  
Soldering Iron  
Multimeter

SUPPLIES: Resistor  
Solder (Item 18, Appendix E)

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.

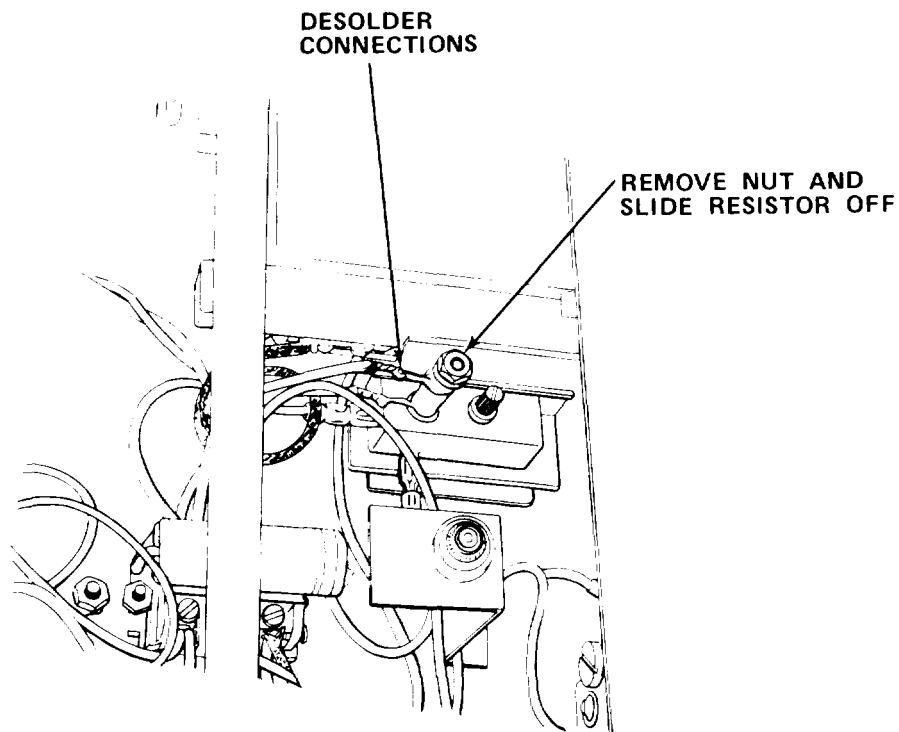


- c. Remove screws holding inner panel.
- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light, or damage to light may result.

- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove.



- g. Desolder leads from resistor.

**NOTE**

Be careful not to damage insulation or resistor mounting stud.

- h. Remove nut, washer, and defective resistor.
- i. Install new resistor and secure with washer and nut.
- j. Solder leads in same manner as original resistor.
- k. Check continuity through resistor at terminal blocks 1 and 3.
- l. Reinstall inner panel.
- m. Reinstall top deck cover and top roller cover.

4-20.4 Replace Pilot Light.

MOS: 83FJ6, Reproduction Equipment Repairer

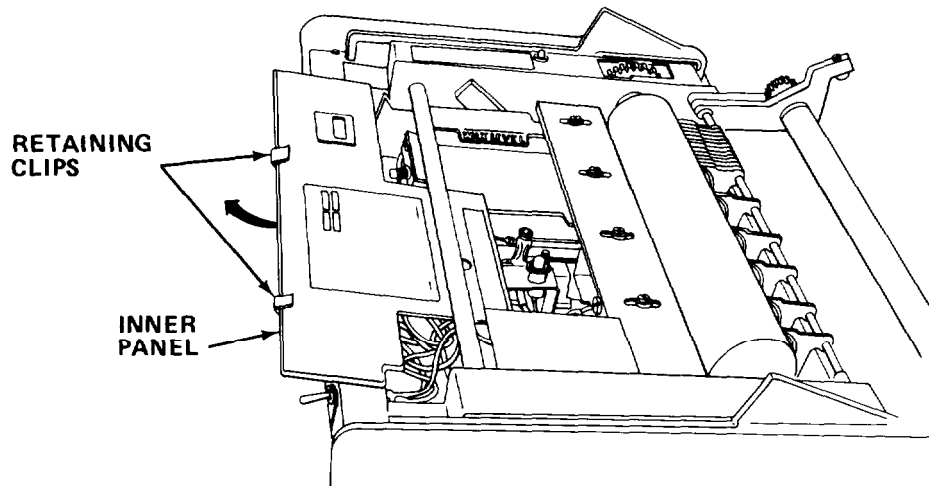
TOOLS: Flat Tip Screwdriver  
Bent Nose Pliers

SUPPLIES: Clear Pilot Light  
Amber Pilot Light  
Red Pilot Light

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Unplug power cord.



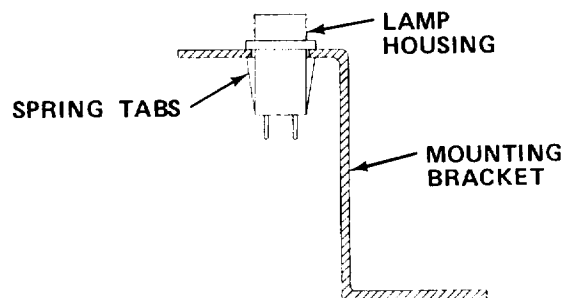
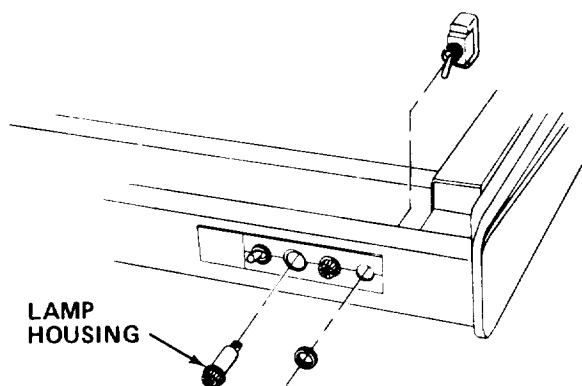
- b. Remove top deck cover and top roller cover.
- c. Remove screw holding inner panel.
- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.



**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light, or damage to light may result.

- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove.



- g. Press spring tabs on side of lamp housing flat with pliers and push housing up through mounting hole until tabs are clear.
- h. Pull out defective lamp.
- i. Tag and disconnect wiring.

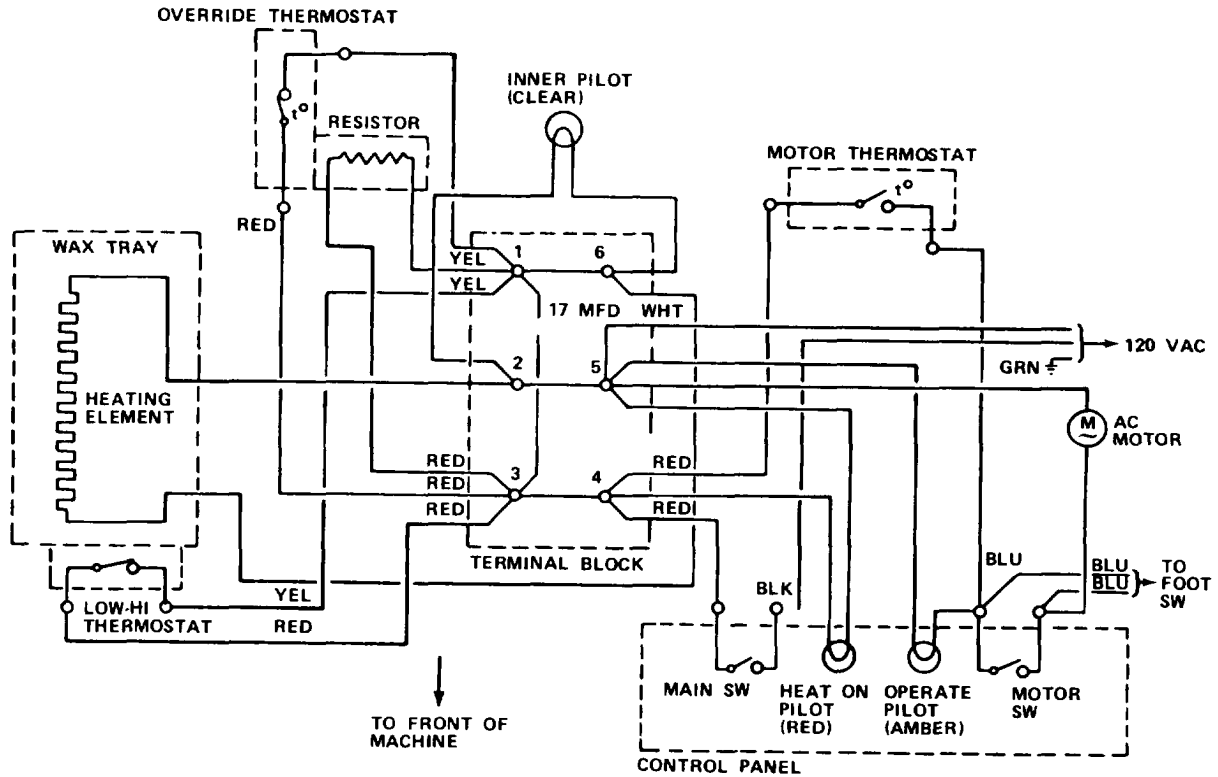
**NOTE**

Pilot light housing, lamp, and wiring are one unit. They can only be removed from the top.

- j. Feed wiring of new lamp down through hole.
- k. Push lamp housing down into hole until it snaps in place.

**CAUTION**

When attaching wires to terminal block, be sure that existing connections are not displaced or damage to equipment may result.



- l. Strip 1/2 in. (12.7 mm) of insulation from end of pilot light wires.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

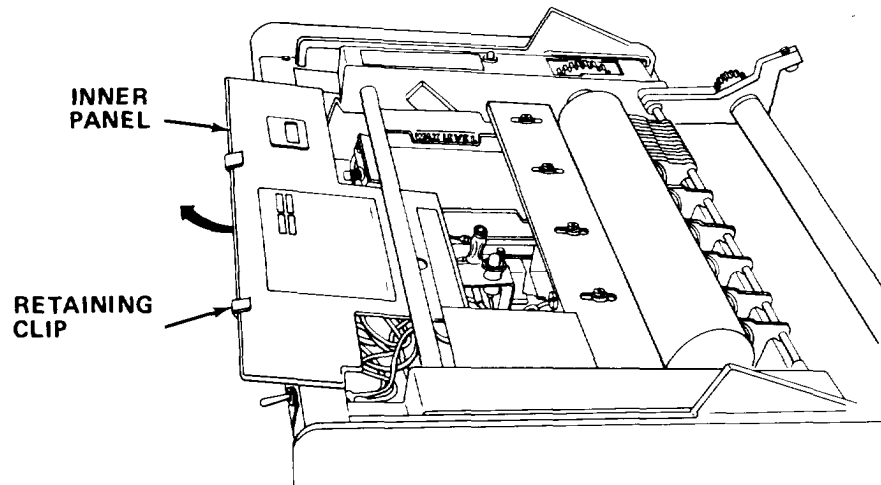
- m. Connect wires to terminals of terminal block.
- n. Reinstall inner panel.
- o. Reinstall top deck cover and top roller cover.

4-20.5 Replace Control Panel Switch(es).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Slip Joint PliersSUPPLIES: Heater Switch  
Motor Switch**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.

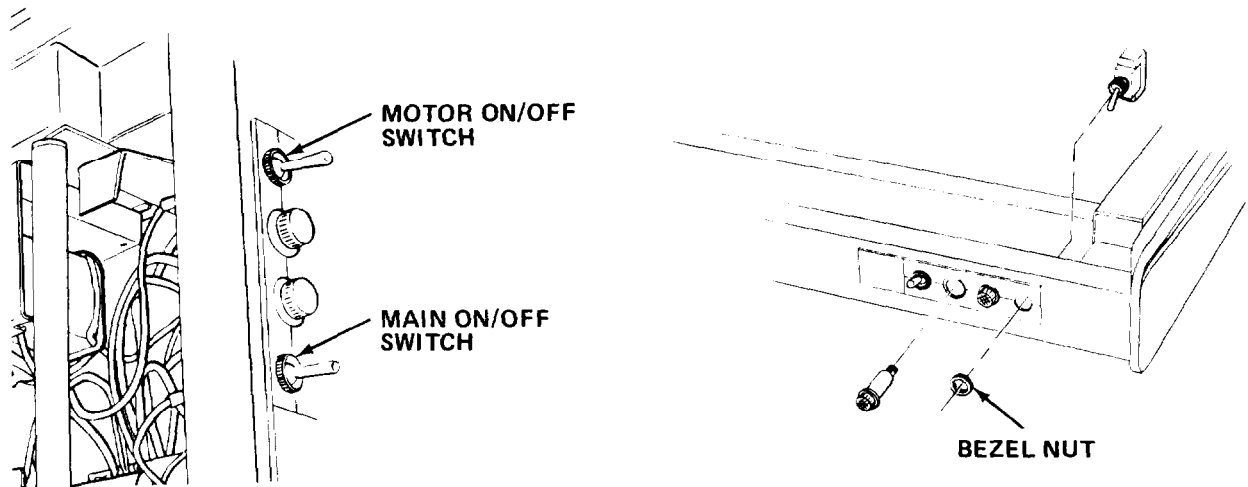


- c. Remove screw holding inner panel.
- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light, or damage to light may result.

- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove.



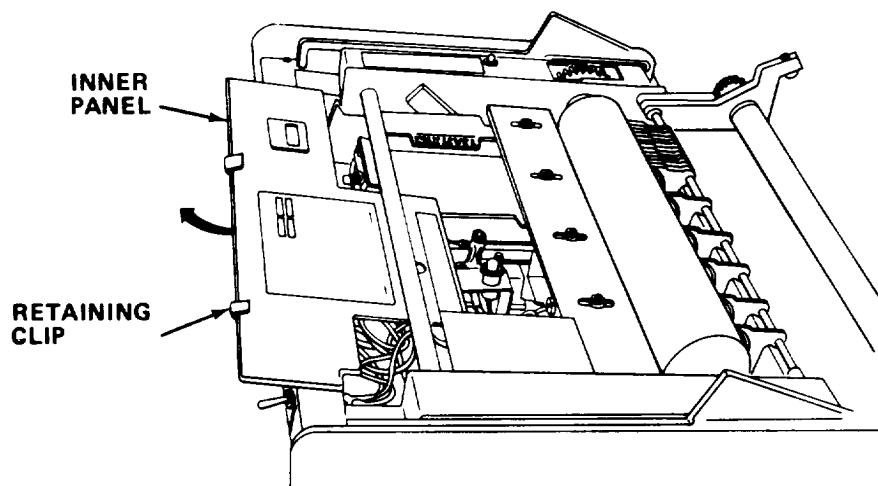
- g. Remove bezel nut on front panel.
- h. Pull switch from rear of panel.
- i. Tag and disconnect wires from switch terminals.
- j. Remove defective switch.
- k. Reconnect wires on terminals of new switch.
- l. Install new switch and secure with bezel nut.
- m. Reinstall inner panel.
- n. Reinstall top deck cover and top roller cover.

4-20.6 Replace Thermostat(s).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Slip Joint Pliers  
9 mm WrenchSUPPLIES: Override Thermostat  
Low/High Thermostat  
Motor Thermostat**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.

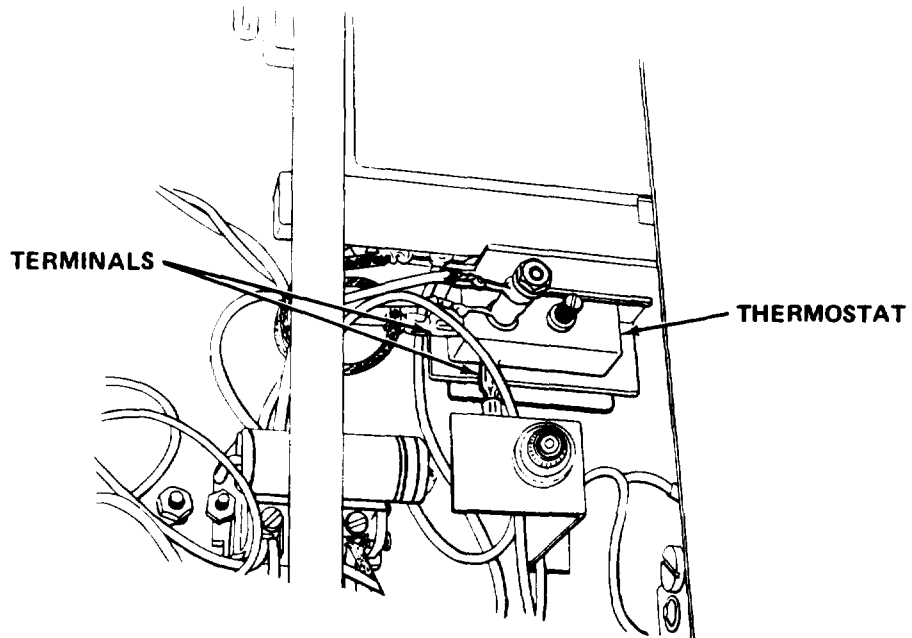


- c. Remove screws holding inner panel.
- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.

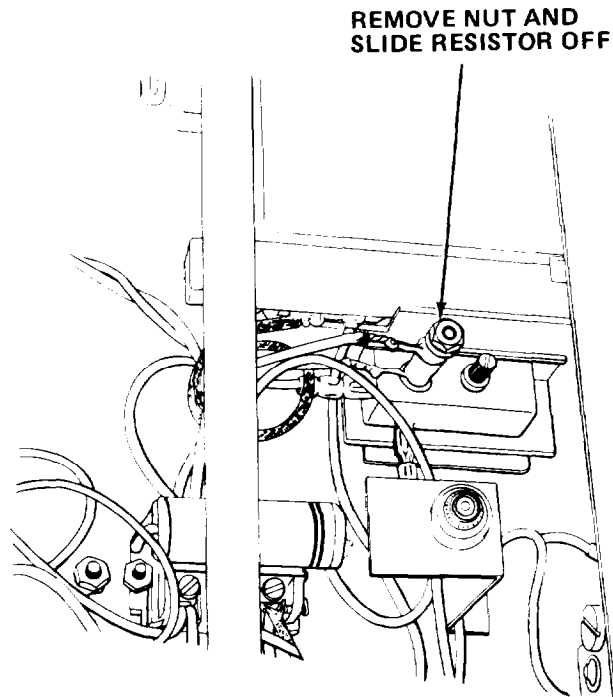
**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove.



- g. Tag and disconnect wires from terminals of defective thermostat.
- h. Remove thermostat mounting screw.



**NOTE**

The following additional step is required when replacing override thermostat.

- i. Remove resistor from override thermostat. Attach to new thermostat.
- j. Remove defective thermostat.
- k. Insert new thermostat in wax coater in same manner as original.
- l. Tighten mounting nut.
- m. Reconnect wires according to wiring diagram.
- n. Reinstall inner panel.
- o. Reinstall top deck cover and top roller cover.

4-20.7 Adjust Thermostats.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Dial Thermometer

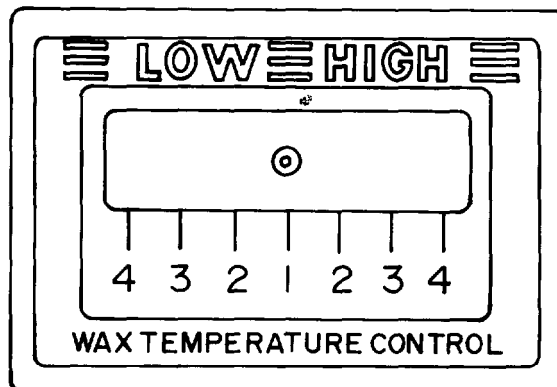
**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

**NOTE**

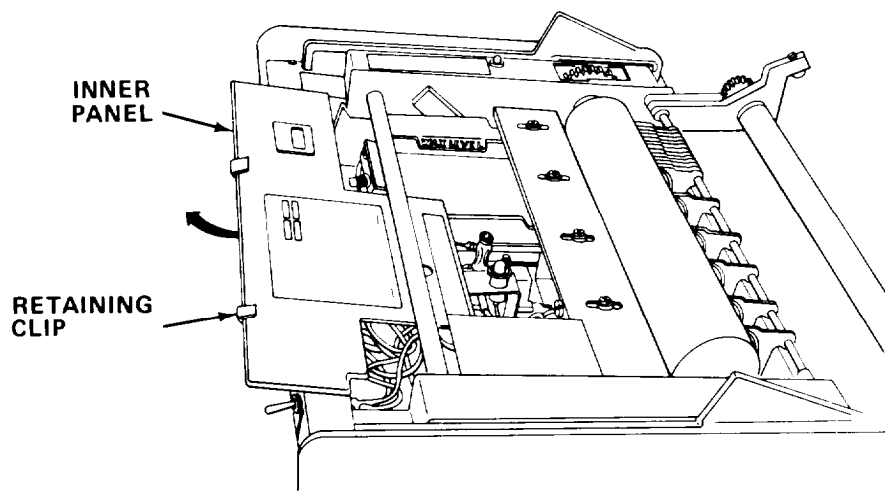
This procedure must begin with wax coater completely cool. If it has been used, allow machine to cool for at least two hours with power OFF.

- a. Unplug power cord.
- b. Remove top deck cover and top roller cover.



- c. Set LOW/HIGH thermostat to position 1.



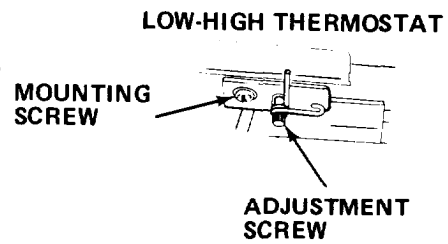
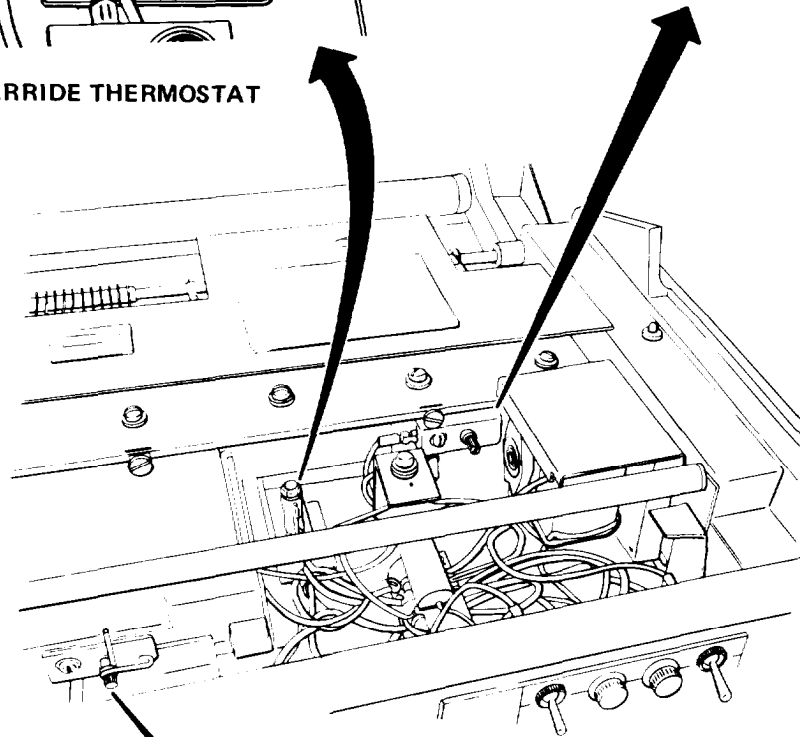
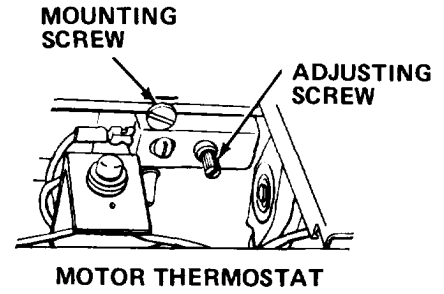
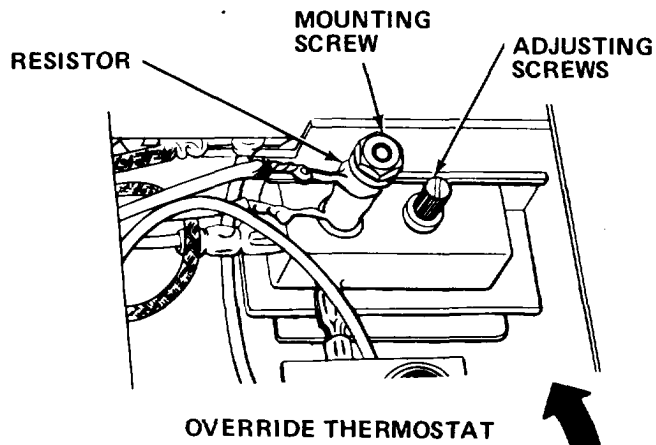


- d. Remove screws holding inner panel.
- e. With screwdriver, push retaining clips toward rollers to loosen inner panel.

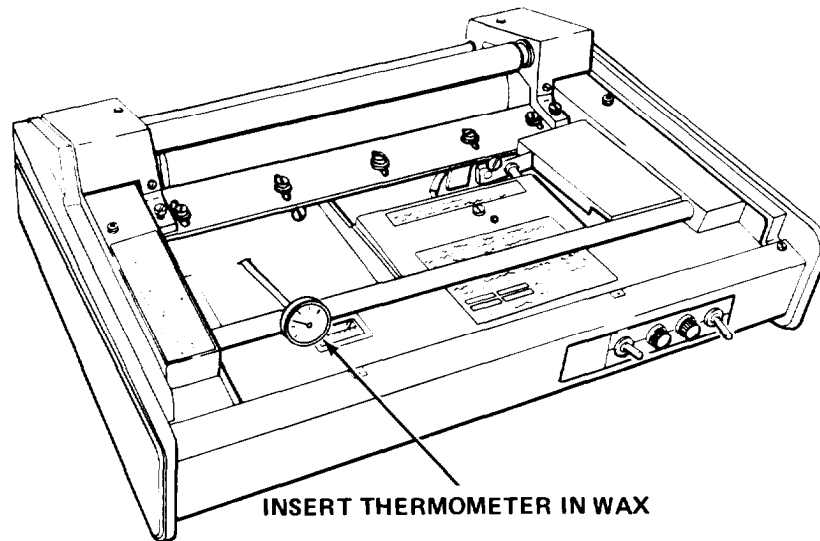
**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

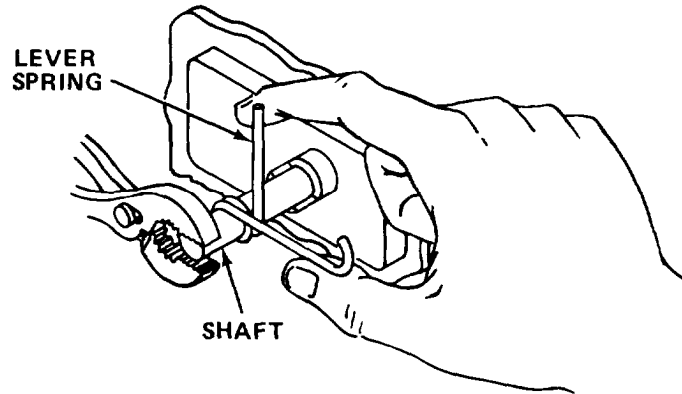
- f. Lift back of inner panel to clear pilot light.
- g. Slide panel to rear of machine and remove.
- h. Turn override thermostat adjusting screw fully to the right until it hits stop.
- i. Note position of motor thermostat.
- j. Turn thermostat adjusting screw approximately one-half turn to the left.



- k. Plug power cord into an outlet.
- l. Turn MAIN switch ON.
- m. Immediately record starting time.



- n. As soon as wax is soft enough, insert dial thermometer into wax tray. Push stem as far under coating as it will go.
- o. Rest dial thermometer on edge of wax tray.
- p. Stem should rest approximately in center of tray.
- q. When thermometer reaches 210°- 220°F (approximately 10 min), immediately turn override thermostat adjusting screw to the right slowly until inner pilot light goes out.
- r. Override thermostat is now set.
- s. When wax on coating roller appears melted (approximately 10 min from start), slowly turn motor adjusting screw to the right until amber OPERATE pilot light on front panel lights.
- t. After motor thermostat is set, wait approximately 15 min for temperature to stabilize.



u. Note thermometer reading. If it is not between 175° and 178° F, adjust as follows:

(1) If temperature is below 175° F.

(a) Hold shaft of thermostat steady with pliers.

(b) Squeeze spring lever and move to the left a few degrees.

(2) If temperature indicated is above 178° F.

(a) Hold shaft steady with pliers.

(b) Squeeze lever spring and move to the right a few degrees.

(3) After adjusting thermostat lever:

(a) Move lever to position in normal fashion.

(b) Allow time for temperature to adjust (approximately ten minutes).

(c) Note thermometer reading. If too low or too high, repeat steps as necessary.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

q. Reinstall inner panel by sliding it back into retaining clips.

r. Reinstall top deck cover and top roller cover.

s. Turn MAIN switch OFF if wax coater is not to be used.

4-20.8 Replace/Adjust Drive Belt.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Cross Tip Screwdriver

SUPPLIES: Belt

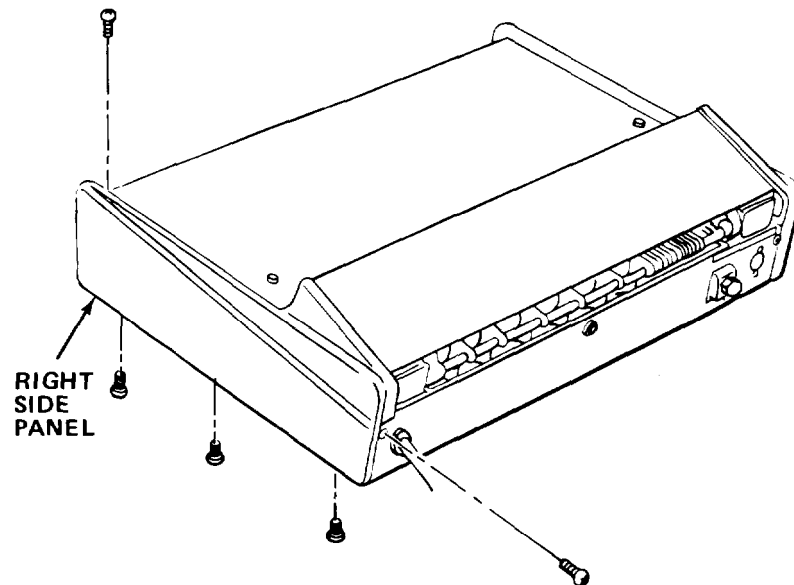
**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

**NOTE**

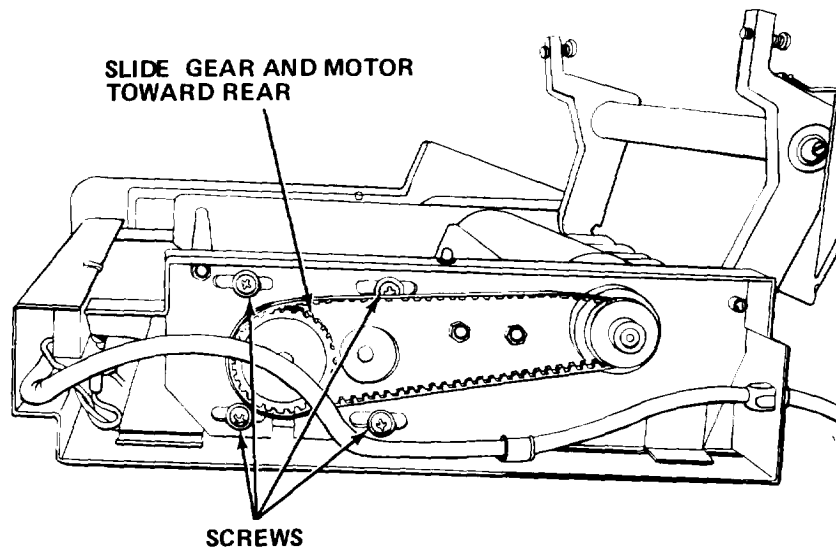
This procedure must begin with wax coater completely cool. If it has been used, allow machine to cool for at least two hours with power OFF.

- a. Unplug power cord.
- b. Remove top roller cover and top deck cover.



- c. Remove screws holding right side panel.

- d. Grasp edges and pull right side panel away from wax coater.



- e. Loosen four screws holding main drive motor.
- f. Check belt for signs of damage. If not damaged, check to see if it is loose. If loose, perform the following steps:
- (1) Grasp the main gear and slide it and motor away from secondary gear belt pulls taut.
  - (2) Go to step j.
- g. Grasp main drive gear and slide toward secondary gear (rear).
- h. Remove defective belt. Slip new belt on gears.

**NOTE**

Be sure that teeth of belt lie in grooves of gears.

- i. With one hand, grasp main gear and slide it away from secondary gear until belt is taut.

**NOTE**

Do not make belt so tight that sudden stopping of secondary gear will snap or stretch belt.

- j. While holding main gear in place:
  - (a) Tighten one of motor mounting screws.
  - (b) Release main gear and tighten remaining motor mounting screws.
  - (c) Check that belt will not slip by trying to turn main gear while holding secondary gear still.
  - (d) If belt slips over gear, it is too loose.
- k. Reinstall right side panel.
- l. Make certain that power cable is not hung up.
- m. Reinstall and tighten right side panel screws.
- n. Reinstall top deck cover and roller cover.

4-20.9 Replace Power Cable.

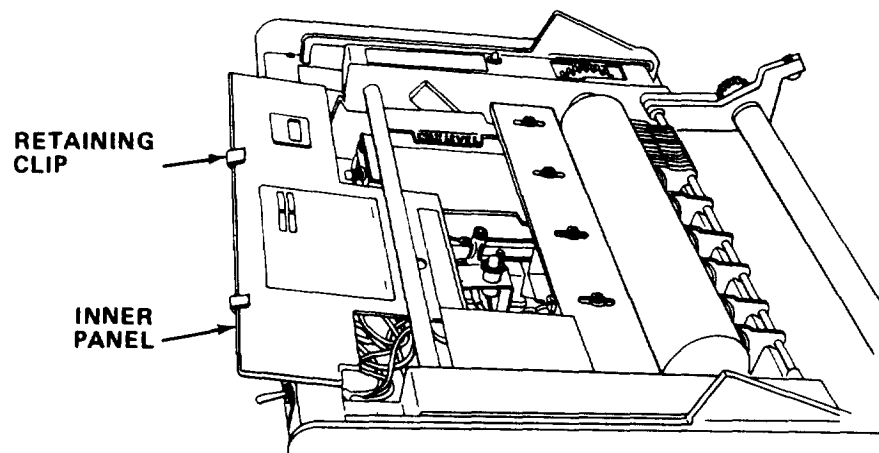
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Cross Tip Screwdriver  
Wire Stripper/Crimper  
9 mm Wrench

SUPPLIES: Power Cable  
Open End Terminal Connectors

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.



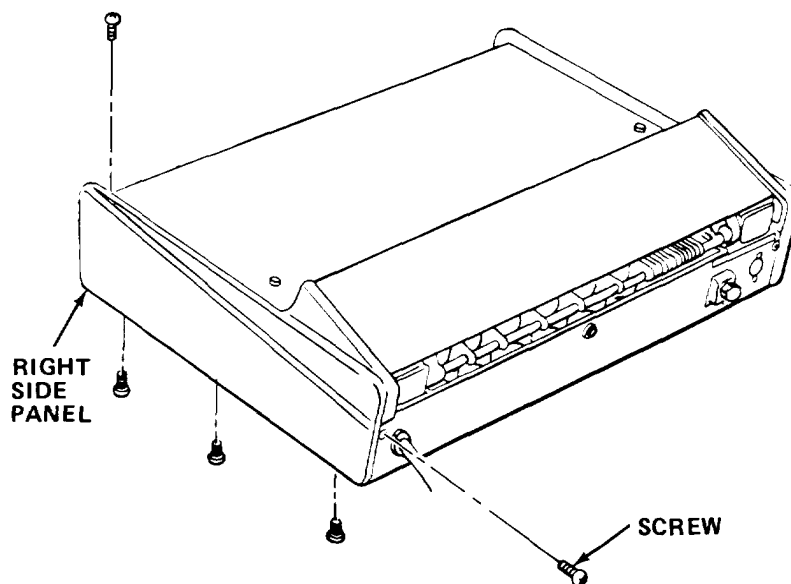
- c. Remove screw holding inner panel.
- d. Grasp back of inner panel, lift, and pull it toward rollers.



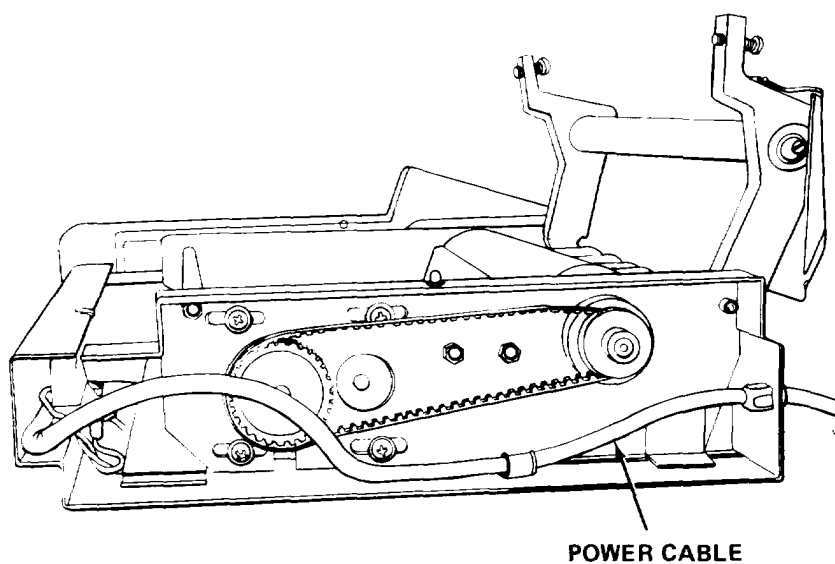
**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

- e. When it is free of mounting brackets, lift back and above pilot light and slide it out front of wax coater.



- f. Remove screws holding right side panel.  
g. Grasp edges of right side panel and pull away from wax coater.



- h. Loosen cable holding brackets.

- i. Remove cable wires from ground terminal, HEAT ON switch, and terminal block.
- j. Pull cable out of wax coater through hole in rear panel.
- k. Feed new cable through hole in rear panel and through cable holding brackets.
- l. Strip insulation from ends of wires and crimp on terminal connectors.
- m. Attach wires to ground, HEAT ON switch, and terminal block per wiring schematic.
- n. Tighten cable holding brackets.
- o. Reinstall right side panel.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

- p. Reinstall inner panel.
- q. Reinstall top deck cover and top roller cover.

4-20.10 Replace Heating Element.

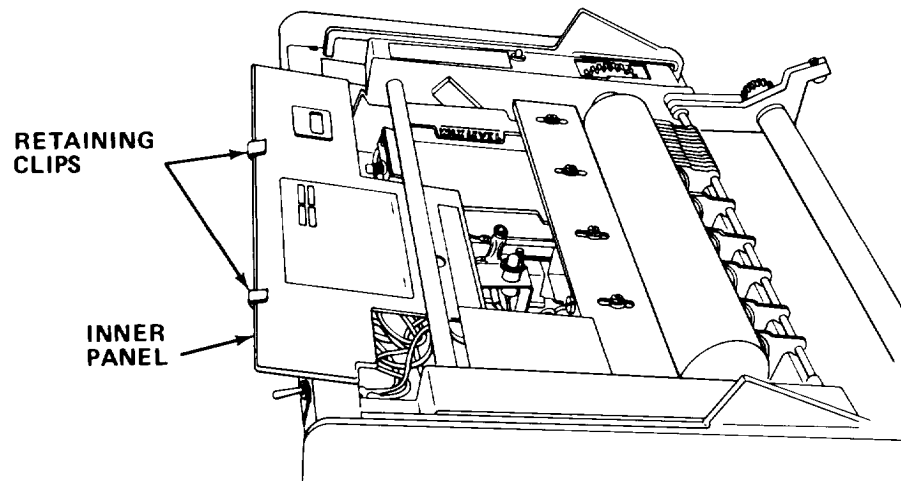
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
Cross Tip Screwdriver  
Wire Stripper/Crimper  
Heat Shrink Gun

SUPPLIES: Heating Element

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.
  - a. Unplug power cord.
  - b. Remove top deck cover and top roller cover.

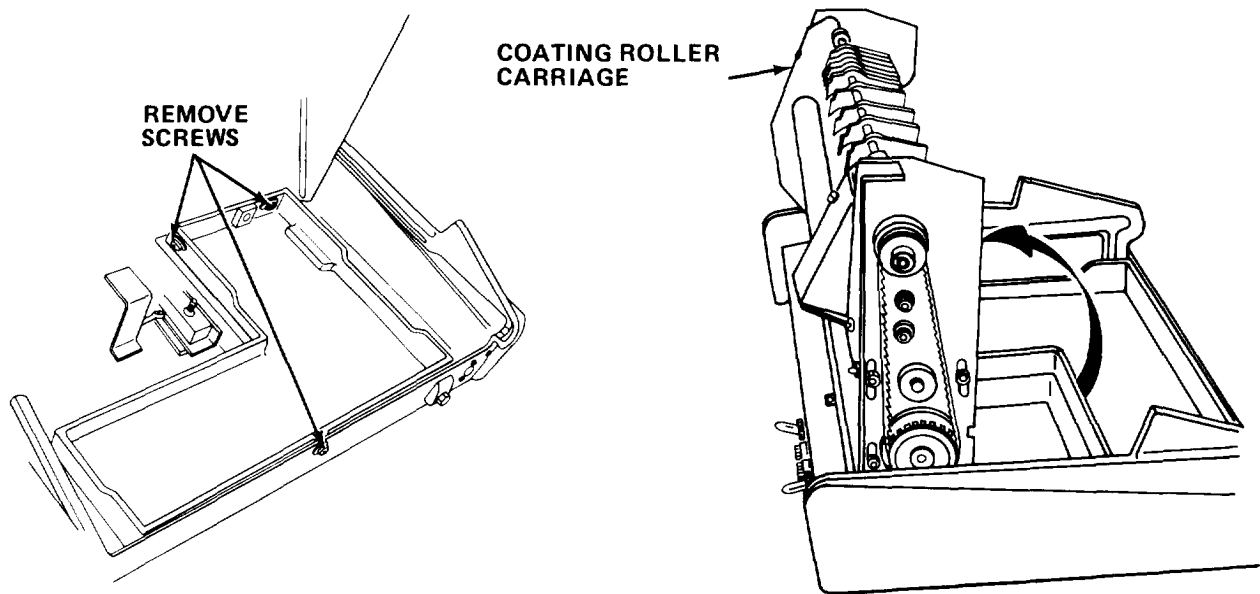


- c. Remove screws holding inner panel.
- d. With screwdriver, push retaining clips toward rollers to loosen inner panel.

**CAUTION**

When moving inner panel, keep rear of machine lifted so it does not catch on pilot light or damage to light may result.

- e. Lift back of inner panel to clear pilot light.
- f. Slide panel to rear of machine and remove
- g. Melt wax in tray with heat shrink gun.



- h. Using top pressure roller as handle, lift coating roller carriage until it stands straight up.
- i. Allow time for wax tray to cool and wax to harden.
- j. Remove screws holding wax tray.
- k. Tag and disconnect heater element wires.
- l. Lift out wax tray.
- m. Pop out defective element from recess underneath tray.
- n. Insert new element in recess and reinstall wax tray and secure with screws.
- o. Reconnect heater element wires.
- p. Heat wax and when melted lower roller carriage gently in place.
- q. Press gently on both sides to be sure of seating.
- r. Reinstall inner panel.
- s. Reinstall top deck cover and top roller cover.

4-20. 11 Replace Gear.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Ball Peen Hammer  
Pin Punch  
Cross Tip Screwdriver

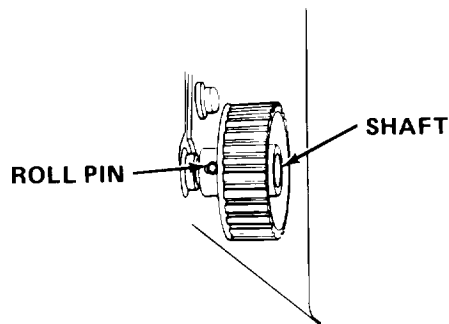
SUPPLIES: Gear

- a. Turn off power and allow wax to harden.

**WARNING**

- Serious injury may occur if internal components are touched when heat is on. Remove heat source and allow to cool, or wear protective clothing before servicing.
- Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

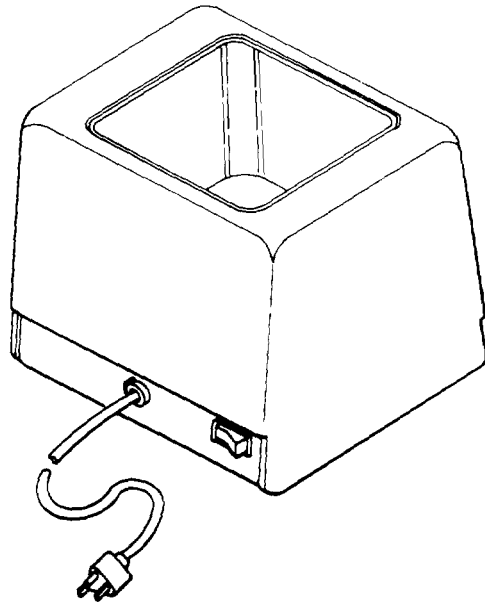
- b. Unplug power cord.
- c. Remove top deck cover.
- d. If damaged gear is on pressure roller, remove cover panel.
- e. Remove roll pin attaching gear to shaft.



- f. Slide defective gear from shaft.
- g. Slide new gear on shaft.
- h. Reinstall roll pin.
- i. Reinstall cover.
- j. Plug in power cord.









## CHAPTER 5

### ULTRASONIC CLEANER

#### Section I INTRODUCTION

##### 5-1. GENERAL INFORMATION.

###### 5-1.1 Scope.

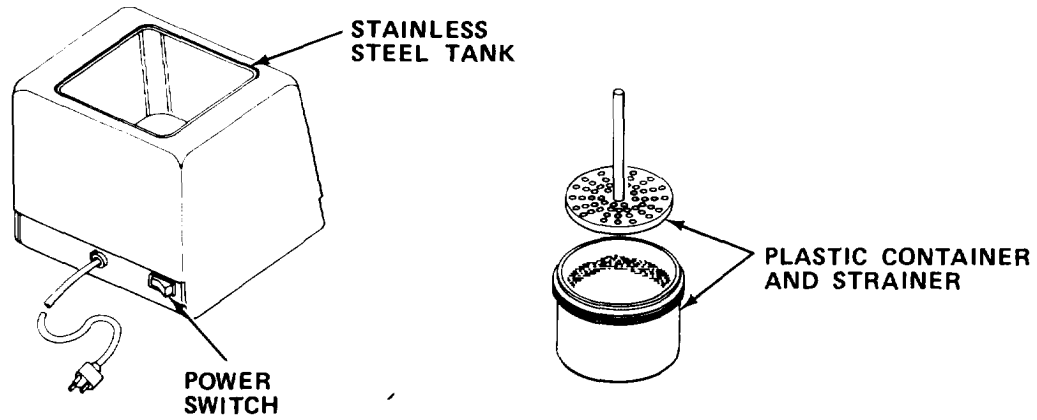
- a. Model Number and Equipment Name. Model 3069USC3 Ultrasonic Cleaner
- b. Purpose of Equipment. To clean drafting/drawing pens.

##### 5-2. EQUIPMENT DESCRIPTION.

###### 5-2.1 Equipment Characteristics, Capabilities, and Features.

- a. Cleans without disassembly.
- b. Removes dried ink.
- c. Portable.

5-2.2 Location and Description of Major Components.



STAINLESS STEEL TANK. Holds water.

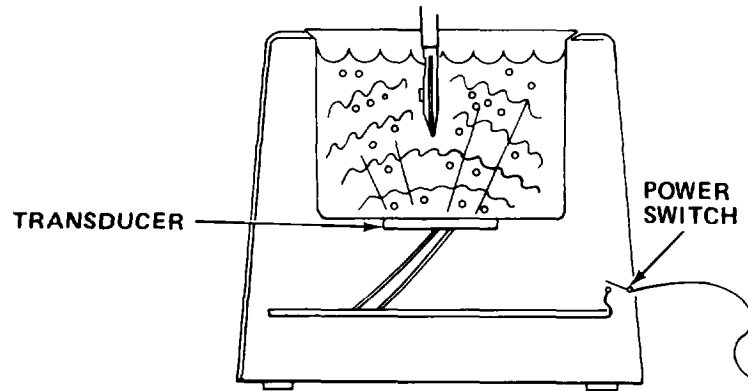
PLASTIC CONTAINER AND STRAINER. Holds small parts in solution for cleaning.

POWER SWITCH. Turns machine ON or OFF.

5-2.3 Equipment Data.

Weight	5.51 lbs (2.5 kg)
Power Requirements	115 V, 60 Hz, 60 W

**5-3. TECHNICAL PRINCIPLES OF OPERATION.**

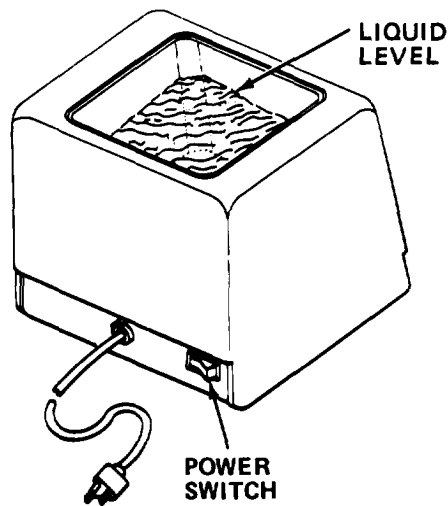


POWER SWITCH. When turned ON, provides power to the transducer.

TRANSDUCER. Generates ultrahigh frequency sound waves.

**Section II OPERATING INSTRUCTIONS**

**5-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.**



Control or Indicator	Function
Liquid Level	Level of liquid in stainless steel tank must be 1/3 full.
Power Switch	Turns power on or off.

**5-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.**

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

**5-5.1 PMCS Procedures.**

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.
- g. Interval columns. This column determines the time period designated to perform your PMCS.
- h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.
- i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.
- j. List of tools and materials required for PMCS is as follows:

<u>Item</u>	<u>Quantity</u>
Cheesecloth (Item 5, Appendix E)	ar

**Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

**NOTE**

If the equipment must be kept in continuous operation, check and service only those items that can safely be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

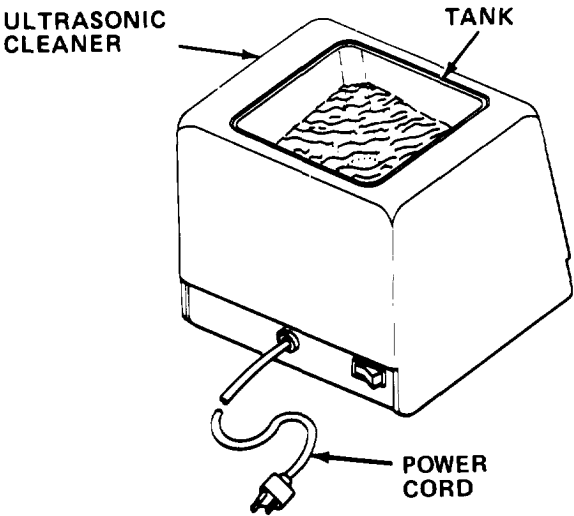
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><u>ULTRASONIC CLEANER</u></p> <p><u>Inspect Cleaner.</u></p> <p style="text-align: center;"><b>WARNING</b></p> <p>Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.</p> <div style="text-align: center;">  <p>The diagram shows a rectangular ultrasonic cleaner. A label 'ULTRASONIC CLEANER' points to the main body. A label 'TANK' points to the top opening. A label 'POWER CORD' points to the power cord plugged into the bottom of the unit.</p> </div>	

Table 5-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

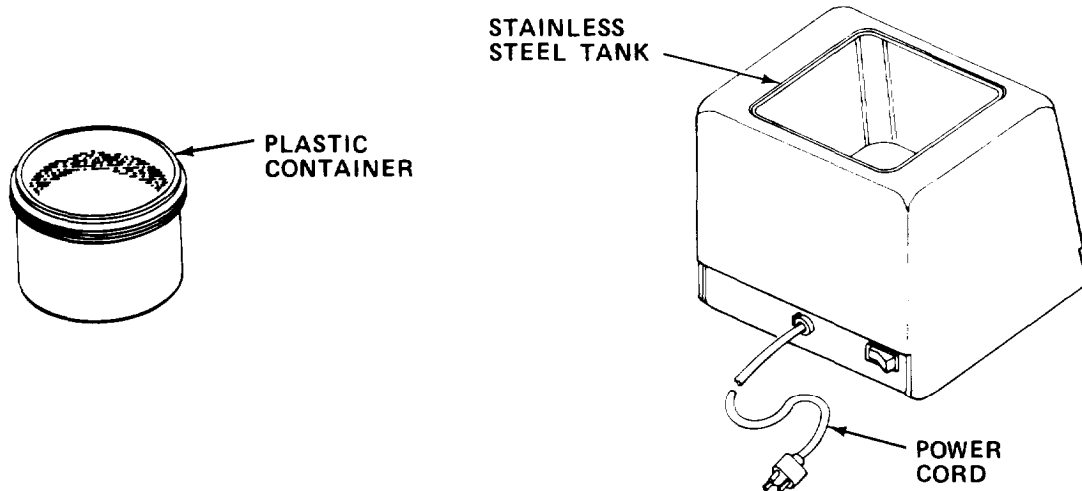
AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<u>ULTRASONIC CLEANER - Cont</u>	Power cord is damaged.  Water surface is not agitating.
		<u>Inspect Cleaner - Cont</u> 1. Check power cord for kinks, frays, or burns. If power cord is defective, notify organizational maintenance. 2. Check tank for dirt or chemical residue. Clean tank by wiping with cheesecloth moistened with water. 3. Check for agitation of water surface.	

## 5-6. OPERATION UNDER USUAL CONDITIONS.

### 5-6.1 Operating Procedure

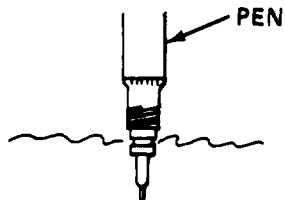


- a. Fill stainless steel tank 1/3 full with fresh, clean water. Fill plastic container with water to within 1/2 in. (12.7 mm) of top.
- b. Add .135 oz (4 ml) of cleaning solution to plastic container.
- c. Plug in power cord to 120 V, 60 Hz grounded outlet.
- d. Turn power on. Be sure water surface in stainless steel tank is agitating.

### WARNING

Do not place fingers in stainless steel tank when ultrasonic cleaner is operating. Cleaning solution may be driven through skin or ultrasonic waves may cause injury to body tissue.

- e. Prepare cleaning solution by operating ultrasonic cleaner for one minute before cleaning pen tips.



**CAUTION**

Do not immerse pen beyond cap threads. Damage to pen may result.

- f. Dip pen about 3/4 in. (19 mm) in cleaning solution.
- g. Lift pen from cleaning solution. Keeping point downward, shake solution from pen onto cheesecloth (Item 5, Appendix E).
- h. Wipe pen.
- i. Draw pen over scrap paper until ink flows freely and shows uniform color.
- j. Turn power off. Unplug power cord.
- k. Dispose of cleaning solution when dirty.

**CAUTION**

Avoid getting water into body of ultrasonic cleaner. Damage to circuit board can result.

- l. Carefully rinse stainless steel tank.
- m. Wipe stainless steel tank dry with cheesecloth (Item 5, Appendix E).

**5-7. OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.

**Section III OPERATOR MAINTENANCE**

**5-8. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**5-9. TROUBLESHOOTING PROCEDURES.** There are no operator troubleshooting procedures assigned for this equipment.

**5-10. MAINTENANCE PROCEDURES.** Operator maintenance is limited to performance of regular preventive maintenance checks and services and replenishment of cleaning solution.



## Section IV ORGANIZATIONAL MAINTENANCE

**5-11. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

### **5-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

5-12.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-12.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

5-12.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-313-24P covering organizational maintenance for this equipment.

### **5-13. SERVICE UPON RECEIPT.**

#### 5-13.1 Checking Unpacked Equipment.

- a. Inspect the equipment for damage incurred during shipment. If equipment has damaged, report the damage on DD Form 6, Packing Improvement Report.
- b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.
- c. Check to see whether the equipment has been modified.

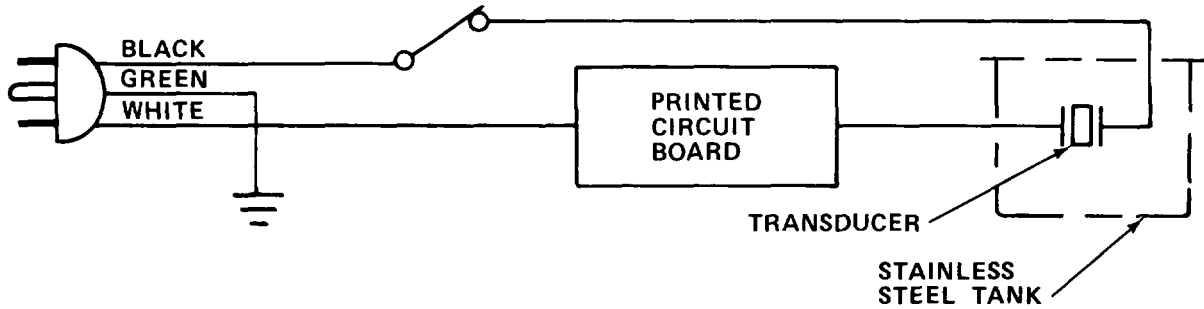
**5-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

### **5-15 ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.**

a. Organizational troubleshooting procedures cover the most common malfunctions that be repaired at the organizational level. Repair or adjustment requiring specialized equipment is not authorized unless such equipment is available. Troubleshooting procedures used by the operator should be conducted in addition to the organizational troubleshooting procedures.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or corrected by a listed corrective action, notify your supervisor.

c. For unidentified malfunctions, use the following schematic or the foldout located the end of this manual for further fault analysis.



d. If the ultrasonic cleaner does not power up when turned on, verify that 120 v ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power procedure for dead receptacle (Table 1-4).

**Table 5-2. ORGANIZATIONAL TROUBLESHOOTING**

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION
1. NO CLEANING ACTION, WATER AGITATES.
Check cleaning action using fresh cleaning solution.
(a) If test was satisfactory, instruct operator to change cleaning solution when dirty.
(b) If test was not satisfactory, replace circuit board (paragraph 5-16.3).
2. NO WATER AGITATION.
Step 1. Using multimeter, check for continuity of power cord.
(a) If continuity exists, proceed to step 2.
(b) If continuity does not exist, replace power cord (paragraph 5-16.1)

**Table 5-2. ORGANIZATIONAL TROUBLESHOOTING - Cont**

---

MALFUNCTION	
TEST OR INSPECTION	
CORRECTIVE ACTION	

---

2. NO WATER AGITATION - Cont

Step 2. Check continuity of power switch.

(a) If continuity does not exist, replace power switch (paragraph 5-16.2).

(b) If continuity does exist, replace circuit board (paragraph 5-16.3).

**5-16. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering organizational maintenance functions for the ultrasonic cleaner. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

**INDEX**

PROCEDURE	PARAGRAPH
Replace Power Cord . . . . .	5-16.1
Replace Power Switch . . . . .	5-16.2
Replace Circuit Board . . . . .	5-16.3

5-16.1 Replace Power Cord.

MOS: 41B, Topographic Instrument Repair Specialist

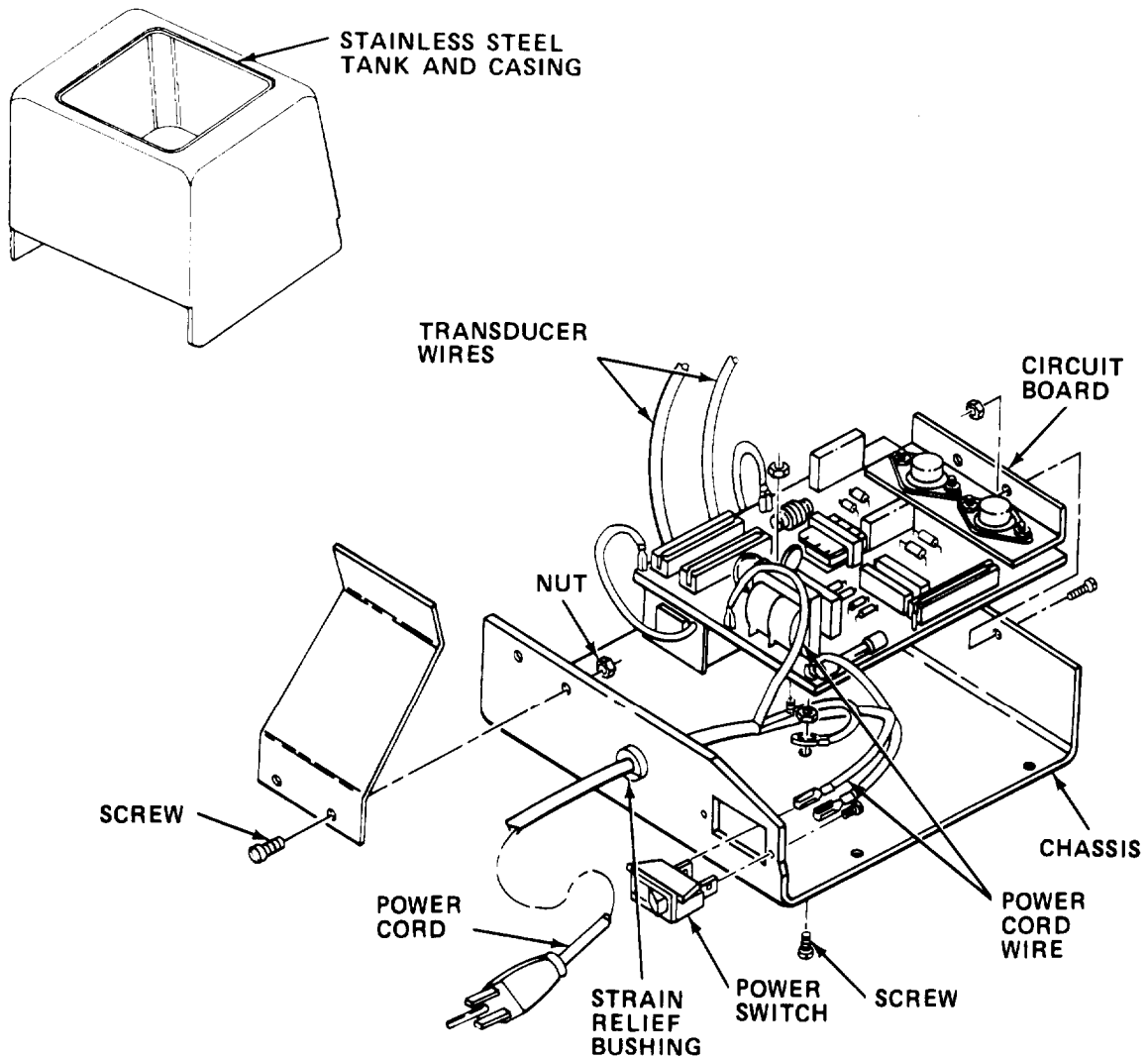
TOOLS: Flat Tip Screwdriver

SUPPLIES: Power Cord  
Wire Clips

**WARNING**

Death or serious injury may occur if power cord is not unplugged before servicing.

- a. Turn power off. Unplug power cord.



- b. Remove screws and washers holding stainless steel tank and casing to chassis.
- c. Lift stainless steel tank and casing free. Set aside.

**NOTE**

Do not disconnect wires to transducer.

- d. Remove three screws, one nut, and one washer holding circuit board to chassis.
- e. Disconnect power cord wire from power switch, chassis ground, and circuit board.
- f. Loosen strain relief bushing from chassis and remove defective power cord.
- g. Install strain relief bushing on new power cord. Insert terminal ends of cord into chassis.
- h. Fit strain relief bushing into chassis.
- i. Reconnect power cord wire to circuit board, chassis, and power switch.
- j. Reinstall circuit board into chassis and secure with one washer, one nut, and three screws.
- k. Reinstall stainless steel tank and casing. Secure with screws and washers.
- l. Fill stainless steel tank 1/3 full with water.
- m. Plug in power cord and turn power on. Check that water surface agitates.

5-16.2 Replace Power Switch

MOS: 41B, Topographic Instrument Repair Specialist

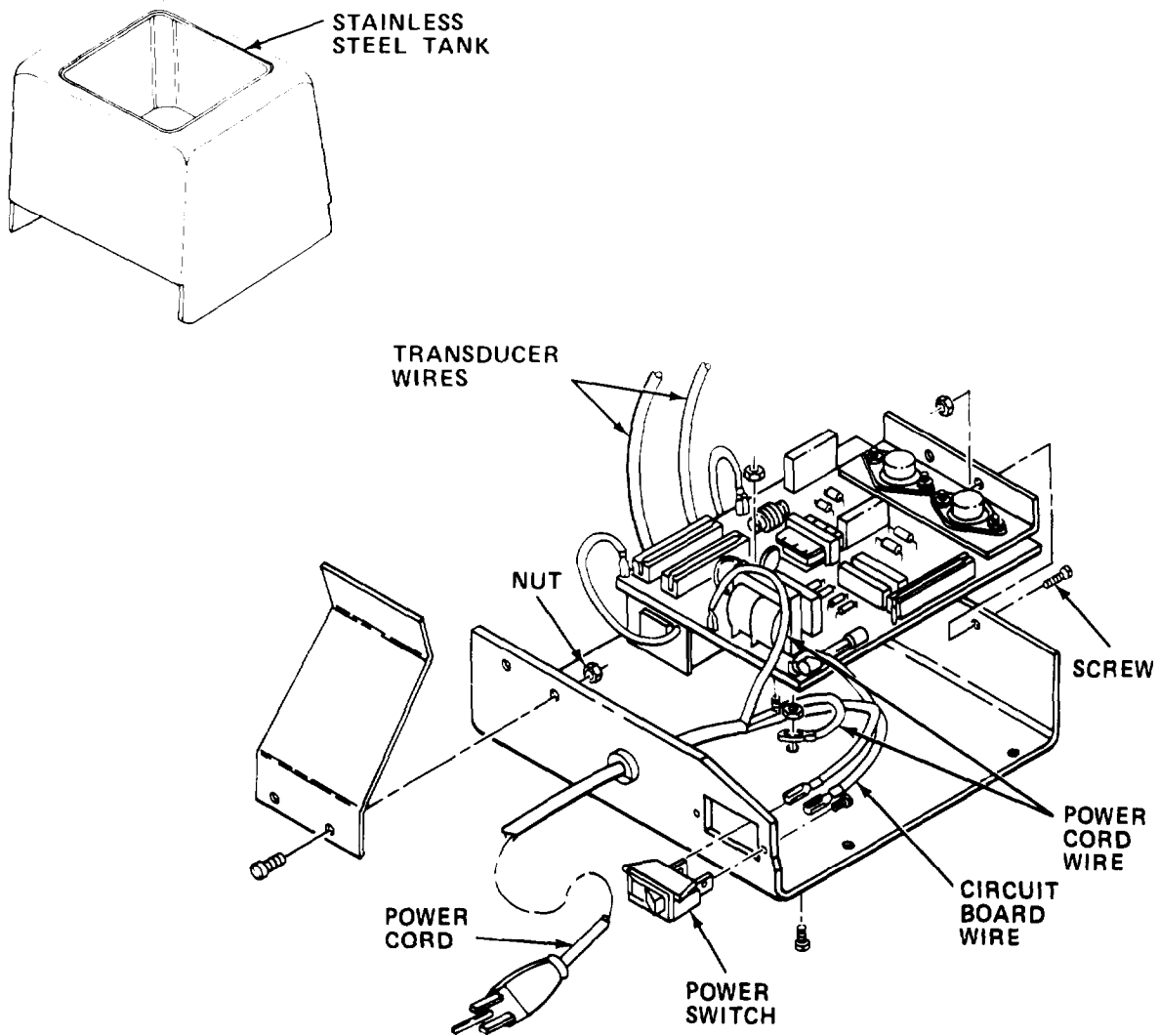
TOOLS: Flat Tip Screwdriver

SUPPLIES: Switch

**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power off and unplug power cord.



- b. Remove screws and washers holding stainless steel tank and casing to chassis.
- c. Lift stainless steel tank and casing free. Set aside.

**NOTE**

Do not disconnect wires to transducer.

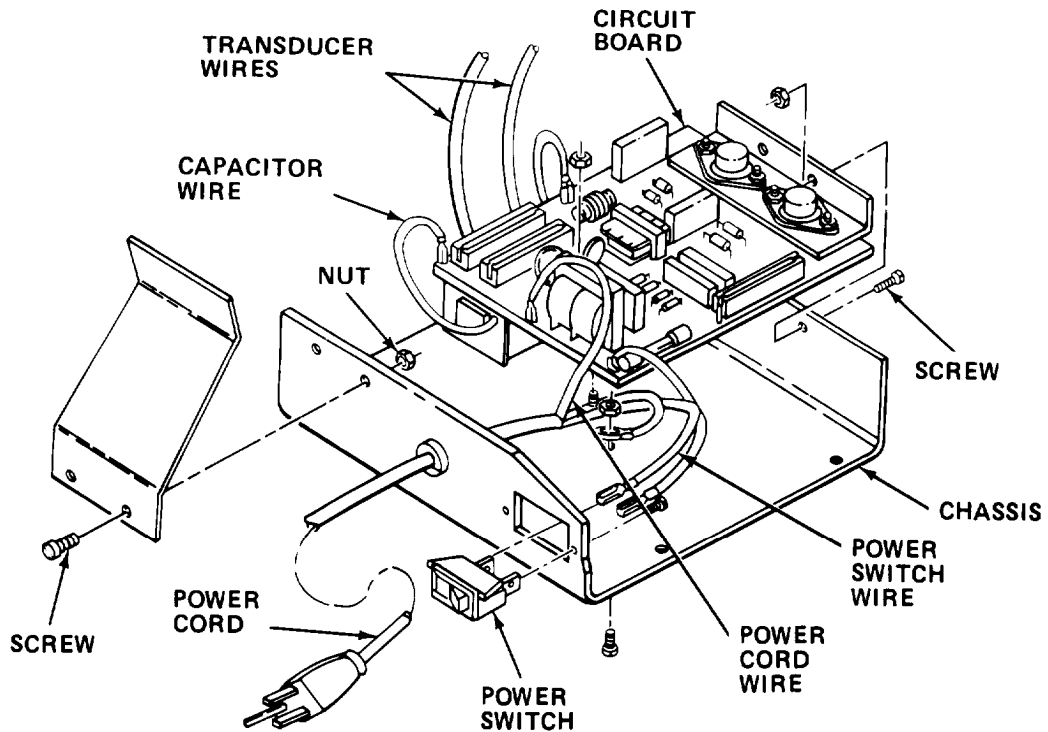
- d. Tag and disconnect power cord wire from power switch.
- e. Press sides of defective power switch and remove from chassis.
- f. Install new power switch in chassis. Push power switch until tabs lock into hole.
- g. Reconnect power cord wires to power switch.
- h. Reinstall stainless steel tank and casing. Secure with screws and washers.
- i. Fill stainless steel tank 1/3 full with water.
- j. Plug in power cord and turn power on. Check that water surface agitates.

5-16.3 Replace Circuit Board.

MOS: 41B, Topographic Instrument Repair Specialist

TOOLS: Flat Tip Screwdriver

SUPPLIES: Circuit Board



**WARNING**

Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.

- a. Turn power off and unplug power cord.
- b. Remove screws and washers holding stainless steel tank and casing to chassis.
- c. Lift stainless steel tank and casing free. Set aside.



**NOTE**

Do not disconnect wires to transducer.

- d. Remove three screws, one nut, and one washer holding circuit board to chassis.
- e. Tag and disconnect power cord wires and power switch wire from circuit board.
- f. Disconnect capacitor wires from circuit board.
- g. Tag and disconnect two transducer wires from circuit board.
- h. Remove defective circuit board.
- i. Install new circuit board.
- j. Reconnect two transducer wires to circuit board.
- k. Reconnect capacitor wires to circuit board.
- l. Reconnect power switch wires and power cord wires to circuit board.
- m. Reinstall three screws, one nut, and one washer holding circuit board to chassis.
- n. Reinstall stainless steel tank and casing. Secure with screws and washers.
- o. Fill stainless steel tank 1/3 full with water.
- p. Plug in power cord and turn power on. Check that water surface agitates.

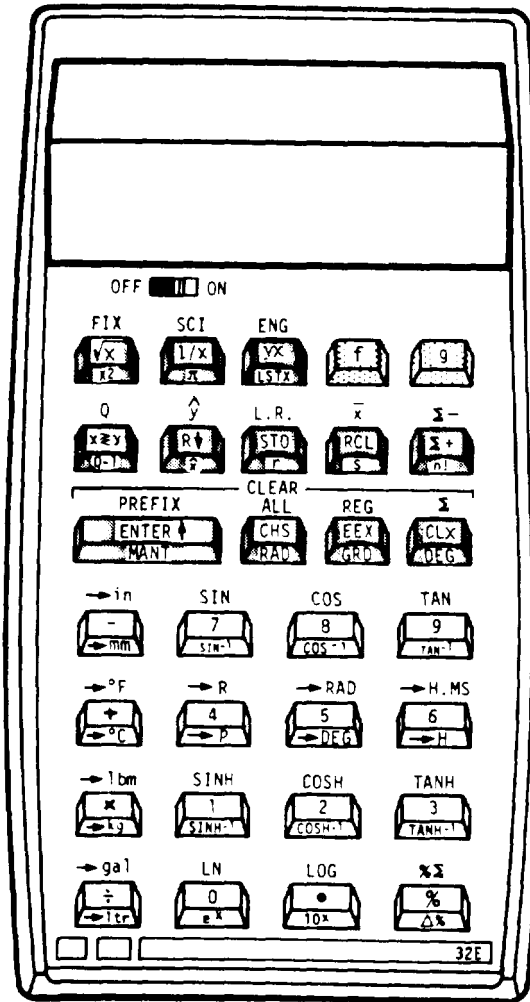
**5-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE**

There are no direct/general support maintenance procedures assigned for this equipment.







## CHAPTER 6

## POCKET CALCULATOR

## Section I INTRODUCTION

**6-1. GENERAL INFORMATION.**6-1.1 Scope.

- a. Model Number and Equipment Name. Model HP-32E Pocket Calculator.
- b. Purpose of Equipment. To perform mathematical calculations.

**6-2. EQUIPMENT DESCRIPTION.**

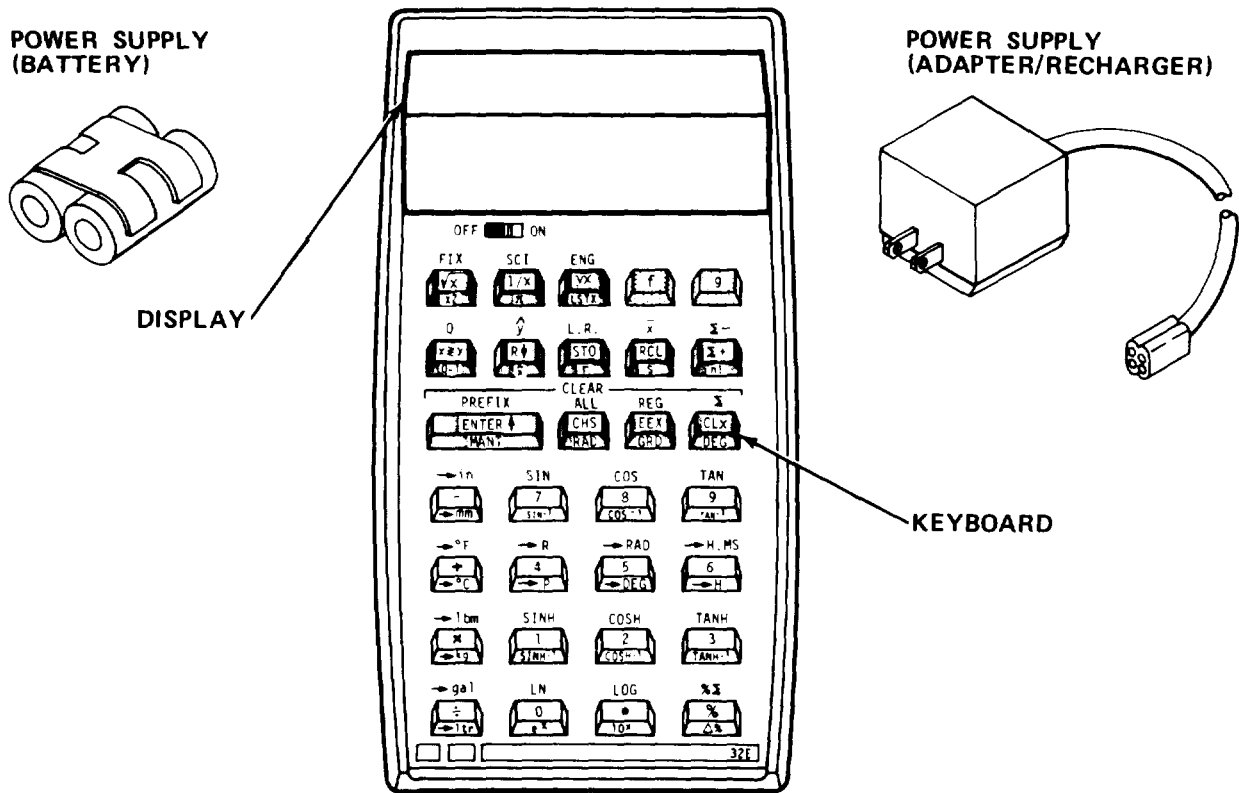
6-2.1 Equipment Characteristics, Capabilities, and Features. Performs mathematical calculations with the following capabilities and features.

- a. Rechargeable battery pack.
- b. AC operation.
- c. Trigonometric functions.
- d. Ten-digit display.
- e. Automatic memory stack.
- f. Fifteen storage registers.
- g. Scientific notation.
- h. Logarithmic functions.
- i. Square root.
- j. Fixed-point display.
- k. Engineering display.
- l. Automatic overflow and underflow.
- m. Error display.
- n. Key-selected metric conversions.
- o. Self-Check.

6-2.2 Equipment Data.

Power Requirements	120 V, 60 Hz
Battery Pack:	
Recharge Time	9 hrs, maximum (calculator off)
	17 hrs, minimum (calculator on)
Operating Time	3 hrs, maximum

**6-3. TECHNICAL PRINCIPLES OF OPERATION.** The purpose of the HP-32E Calculator is to assist its user in the performance of complex or simple mathematic equations and consists of the following functional parts:



**POWER SUPPLY.** Power is provided to the calculator from either the battery pack or ac adapter/recharger. The battery pack consists of two rechargeable nickel cadmium batteries which give the calculator full portability. The adapter/recharger also provides power to the calculator when plugged into a power outlet. When battery pack is in need of recharging, raised decimal is turned on at the far left of the display. When raised decimal is displayed, there are 1 to 25 minutes of operating time left.

**KEYBOARD.** The keyboard is used to select functions and input numbers into the calculator. All keys, except **f** and **g** keys, perform three functions.

One function is indicated by the symbol on the flat surface of the key, a second by the symbol on the slanted key face, and a third by the symbol written above the key on the calculator case. Function printed on the flat face of the key is selected by pressing the key. Function printed above the key is selected by first pressing prefix key  $\boxed{f}$  and then the function key. The function printed *on* the slanted face of the key is selected by first pressing prefix key  $\boxed{g}$  and then the function key.

**DISPLAY.** The display is the X-register of the automatic memory stack and provides a visual readout of latest numeric entry, operation result, or error messages.

**MEMORY.** Memory is divided into two parts; storage registers and automatic memory stack.

a . Storage registers. Storage registers are used to set aside numbers for recall in later calculations. Numbers are stored by first pressing  $\boxed{STO}$  followed by a number 0 thru 8 or a decimal point and a number 0 thru 5. The number in displayed X-register is then copied into the selected register. Recalling a number is accomplished by first pressing  $\boxed{RCL}$  followed by a number 0 thru 8 or a decimal point and a number  $\boxed{0}$  thru  $\boxed{5}$ . The number that is in the selected register will be copied into the displayed X-register without any change to contents of that register. Storage registers  $R_{0}$  through  $R_{5}$  are used for accumulation of statistical data. Turning calculator off will clear (place zeros in) all storage registers.

b. Automatic memory stack. The automatic memory stack is used to store intermediate results during calculations. The stack consists of four registers designated X, Y, Z and T. The contents of X-register are constantly shown on the calculator display. Numbers are manually entered into the memory stack by pressing  $\boxed{ENTER}$ . During chain calculations (long equations), intermediate answers are automatically entered in the memory stack. Each new entry into the stack is first entered in the X-register and, with each additional entry, the stack rolls up one and the contents that *were* in the T-register before roll-up, are lost. The contents of the stack can be viewed by pressing  $\boxed{RCL}$  key four times. The contents of T register are not lost because the stack forms a continuous loop, i.e., the contents of T-register are shifted to the Z-register; Z-register to Y-register; Y-register to X-register; and X-register to T-register. With intermediate answers stored in the stack, operations can be performed with these numbers by pressing the key of the desired operation.

Example: To calculate  $(3 \times 5) + 2$ , press:

$\boxed{3}$  (3 enters X-register.)

$\boxed{ENTER}$  (3 is copied to Y-register.)

$\boxed{5}$  (5 is entered in X-register; 3 stays in Y-register. )

$\boxed{\times}$  (5 is multiplied by 3; result, 15, is placed in X-register; Y-register becomes 0.)

$\boxed{2}$  (15 moves to Y-register 2 enters X-register.)

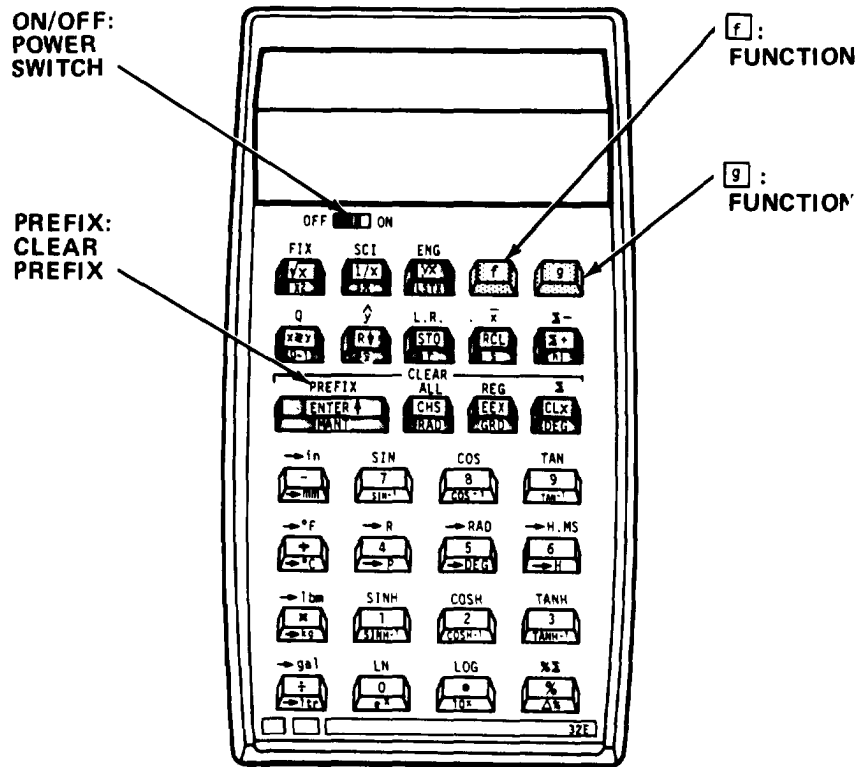
$\boxed{+}$  (2 is added to 15; result, 17, is placed in X-register; Y-register becomes 0)

Section II OPERATING INSTRUCTIONS

6-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.

NOTE

Symbols on flat surface and slanted surface of keys are boxed. Symbols over keys are not boxed.

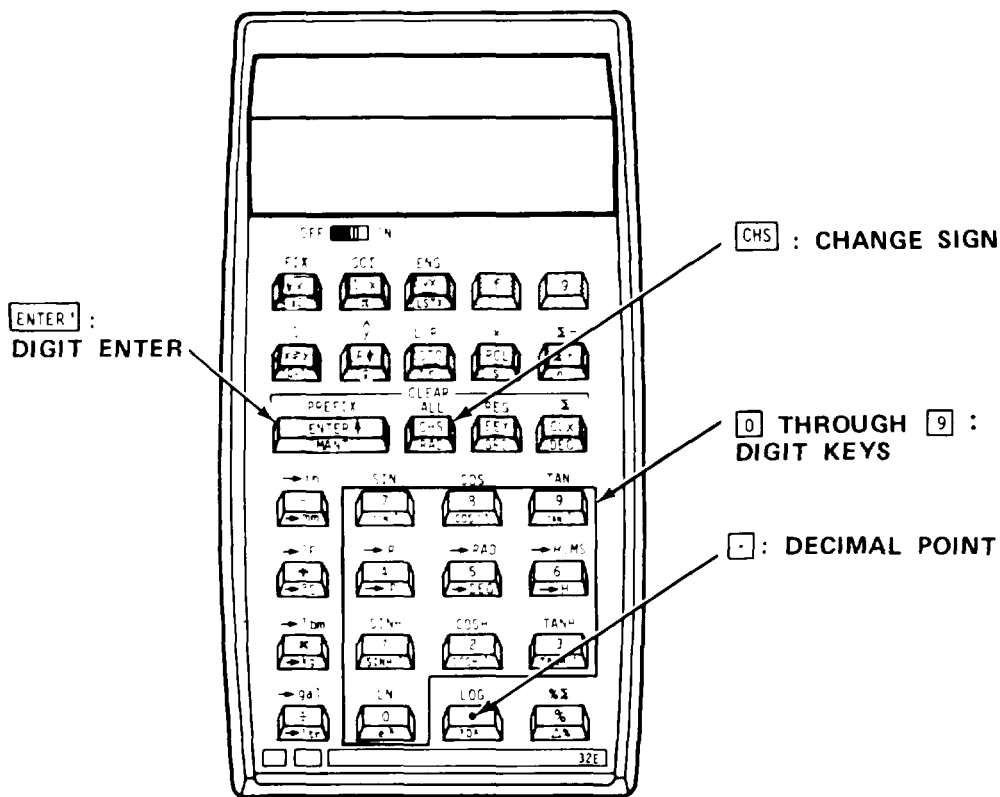


Key	Control or Indicator	Function
OFF ON	Power Switch	Turns power on or off.
f	Function	Pressed before another key, it selects function printed above key.
g	Function	Pressed before another key, it selects function printed on slanted face of key.



Key	Control or Indicator	Function
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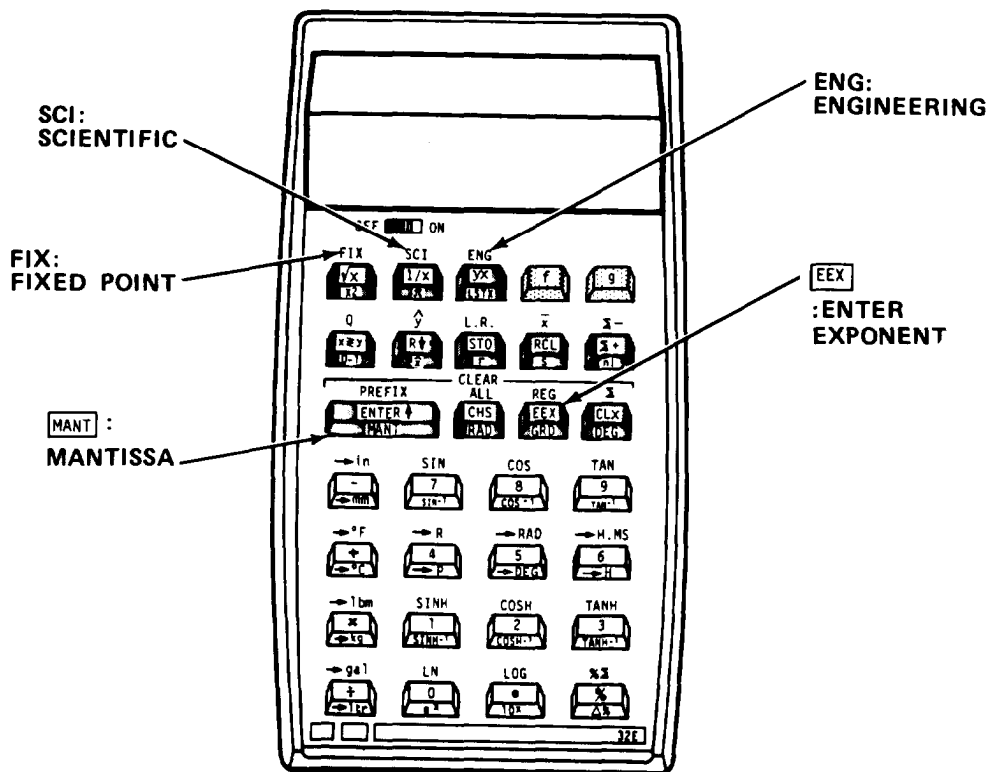
<b>PREFIX</b>	Clear Prefix	<p>Cancels the following key strokes or sequence of key strokes when Dressed after each one:</p> <p> <math>f</math>, <math>9</math>, <math>STO</math>, <math>RCL</math>,  <math>STO</math> <math>\cdot</math>, <math>RCL</math> <math>\cdot</math>,  <math>STO</math> <math>+</math>, <math>STO</math> <math>-</math>,  <math>STO</math> <math>\times</math>, <math>STO</math> <math>\div</math>,  <math>STO</math> <math>+</math> <math>\cdot</math>,  <math>STO</math> <math>-</math> <math>\cdot</math>,  <math>STO</math> <math>\times</math> <math>\cdot</math>,  <math>STO</math> <math>\div</math> <math>\cdot</math>,            FIX SCI, ENG.         </p>
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Digit Entry


- $0$  thru  $9$  Digit Keys Enters digits.
- $\cdot$  Decimal Point Enters decimal point.

Key	Control or Indicator	Function
<b>ENTER</b>	Digit ENTER	Enters copy of number displayed in X-register into Y-register of automatic memory stack. Pressing key also causes contents of Y-register to be shifted to Z-register and Z-register to the T-register. Contents of T-register are lost.
<b>CHS</b>	Change Sign	Changes sign of mantissa or exponent in display. (X-register).

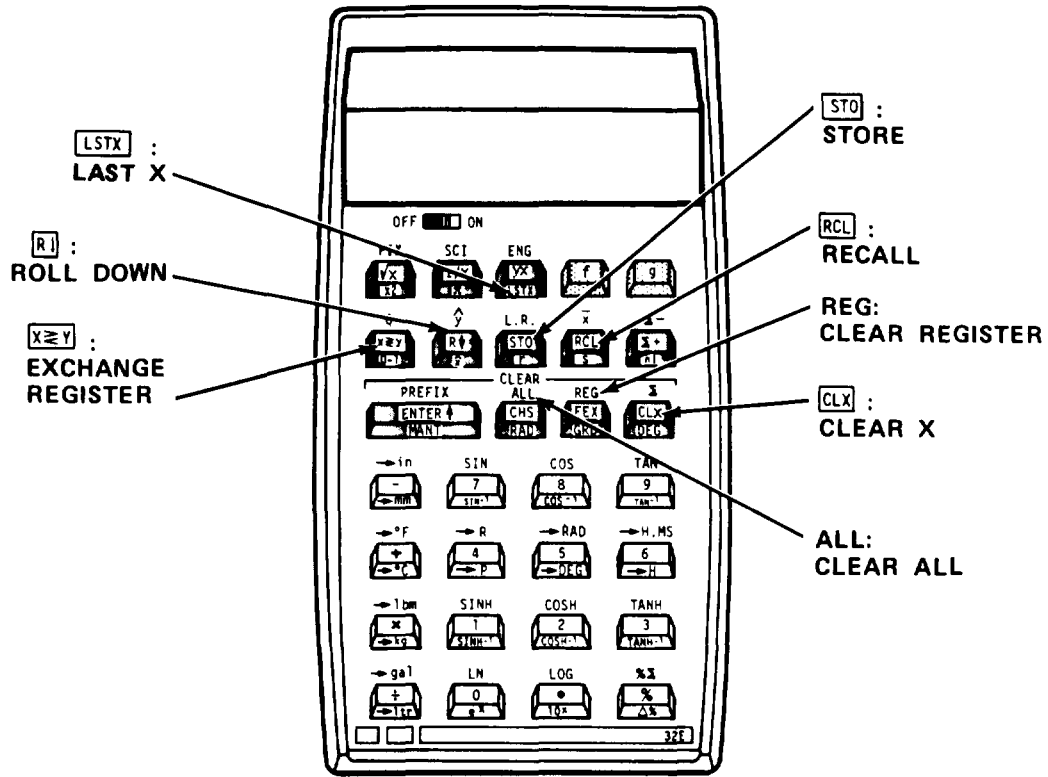


Display Control

<b>EEX</b>	Enter Exponent	After pressing, next numbers keyed in are exponents of 10.
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Key	Control or Indicator	Function
FIX	Fixed Point	Followed by digit key, selects fixed point notation display. Digit entry designates number of digits to be displayed to the right of decimal point.
SCI	Scientific	Followed by the number key that specifies the number of decimal places the display will be rounded to.
ENG	Engineering	Followed by digit key, selects engineering notation display. Digit key specifies number of digits to be displayed to right of decimal point.
	Mantissa	Temporarily displays all 10 digits of mantissa of number in X-register.

Key	Control or Indicator	Function
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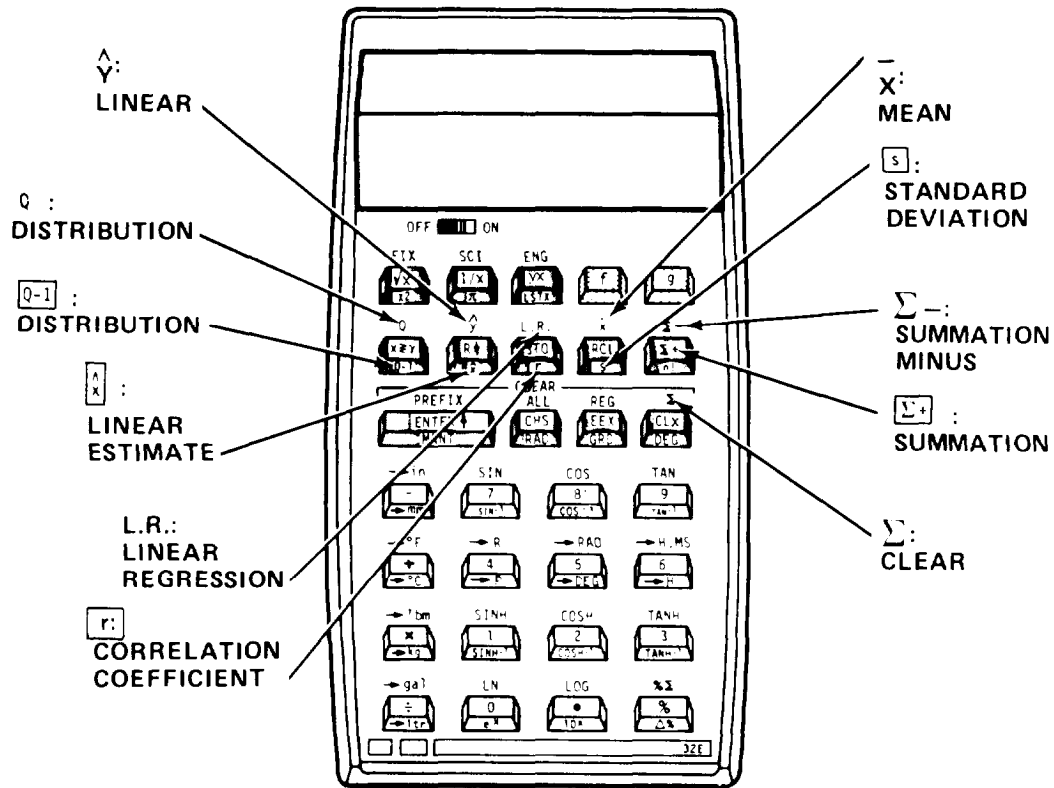


Number Manipulation

<b>X↔Y</b>	Exchange Register	Interchanges contents of X and Y-registers.
<b>R↓</b>	Roll Down	Rolls down contents of automatic memory stack for viewing in X-register without loss of data. When pressed, contents of X-register is shifted to T-register, T-register shifts to Z-register, Z-register shifts to Y-register, and Y-register advances to X-register for viewing.
<b>CLX</b>	CLEAR X	Clears contents of displayed X-register.

Key	Control or Indicator	Function
ALL	CLEAR ALL	Clears contents of memory stack and all storage registers.
<b>STO</b>	Store	Followed by digit key <b>0</b> through <b>8</b> or by a decimal point and a key <b>0</b> through <b>5</b> , stores displayed number in that specified location. Also used to perform storage register arithmetic.
<b>RCL</b>	Recall	Followed by digit key <b>0</b> thru <b>8</b> or by a decimal point and a digit key <b>0</b> thru <b>5</b> , recalls value from specified storage register into the displayed X-register.
REG	CLEAR Register	Clears contents of storage registers R <sub>0</sub> through R <sub>8</sub> . Contents of registers R <sub>0</sub> thru R <sub>5</sub> are unaffected.
<b>LSTX</b>	LAST X	Recalls number displayed before previous operation back into displayed X-register.

Key	Control or Indicator	Function
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Statistical

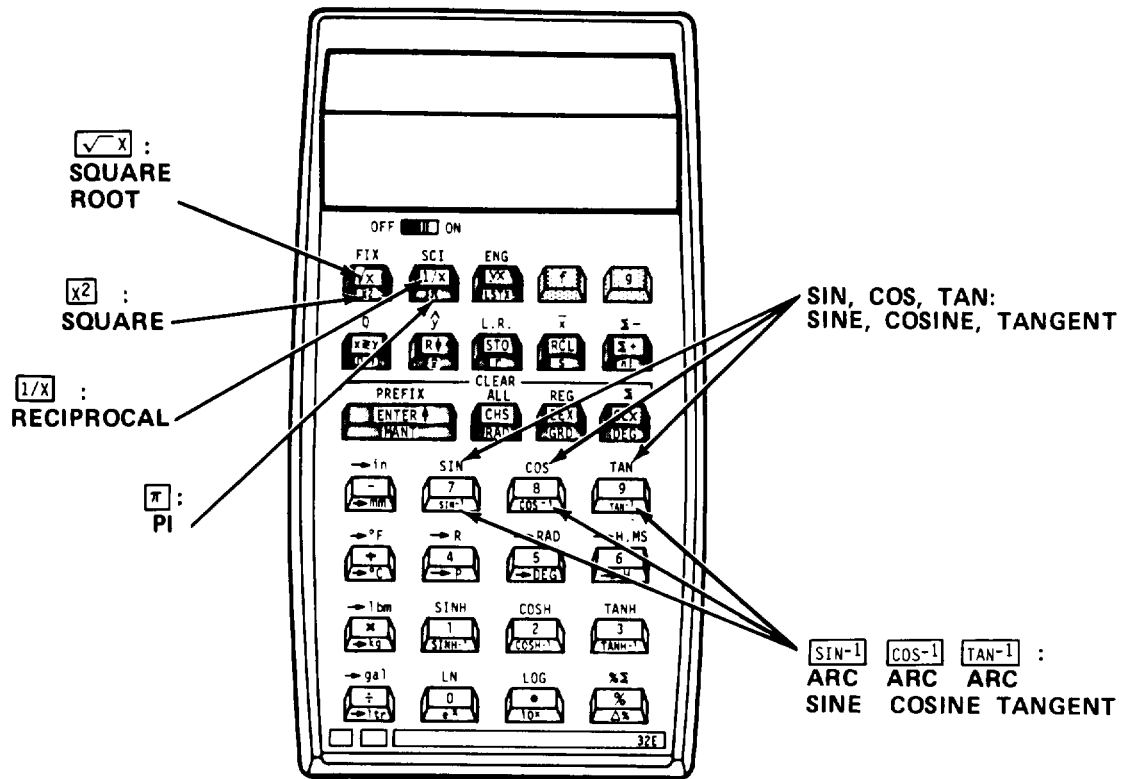
Q	Distribution	Computes area under standard normal distribution curve to left of X.
Q-1	Distribution	Computes X, given area under standard normal distribution curve to left of X.
$\hat{Y}$	Linear Estimate	Computes estimated value of Y for a given value of X.
$\hat{X}$	Linear Estimate	Computes estimated value of X for a given value of Y.

Key	Control or Indicator	Function
L.R.	Linear Regression	Computes Y-intercept and slope for linear function approximated by X and Y values accumulated using $\Sigma^+$ . Value of slope is placed in Y-register.
$r$	Correlation Coefficient	Computes goodness of fit between X and Y values accumulated using $\Sigma^+$ and linear function which they approximate.
$\bar{X}$	MEAN	Computes mean (average) of X and Y values accumulated using $\Sigma^+$ .
$S$	Standard Deviation	Computes standard deviations of X and Y values accumulated using $\Sigma^+$ .
$\Sigma^+$	Summation	Accumulates statistical data in storage registers R.0 thru R.5 using numbers in X- and Y-registers.
$\Sigma^-$	Summation Minus	Subtracts from statistical data in storage registers R.0 thru R.5 using numbers in X- and Y-registers.
$\Sigma$	CLEAR	Clears statistical storage registers R.0 thru R.5.

Key

Control or Indicator

Function

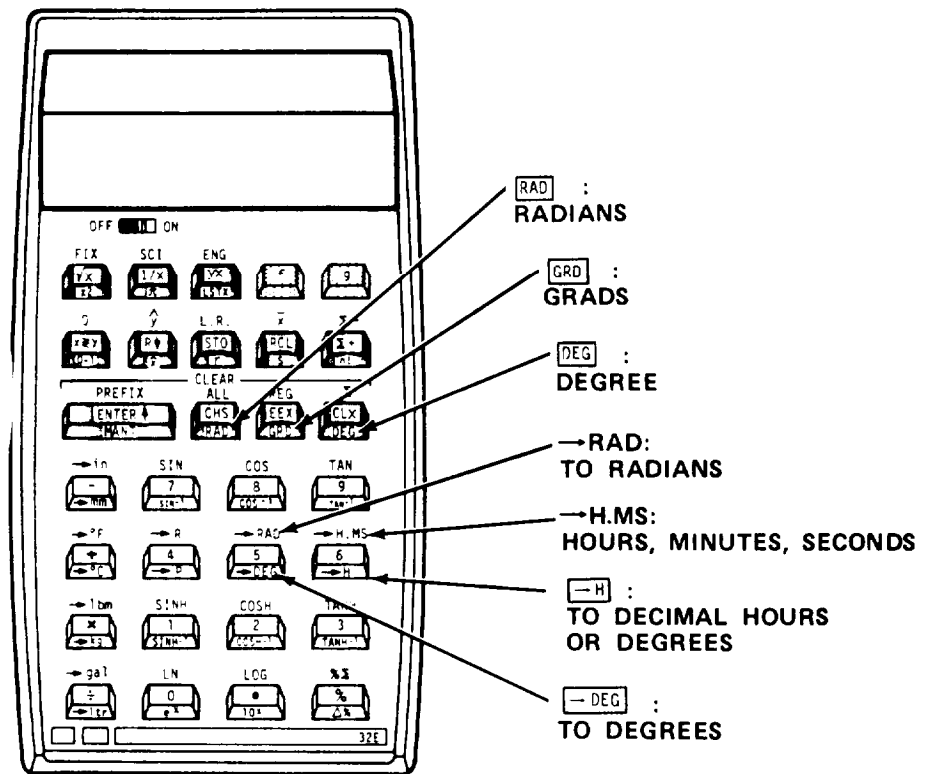


Mathematical

$\sqrt{x}$	Square Root	Computes square root of number in displayed X-register.
$x^2$	Square	Computes square of number in displayed X-register.
$1/x$	Reciprocal	Computes reciprocal of number in displayed X-register.
$\pi$	pi	Places value of pi (3.141592654) into X-register.
SIN, COS, TAN	Sine, Cosine, Tangent	Computes sine, cosine, or tangent of number in displayed X-register.

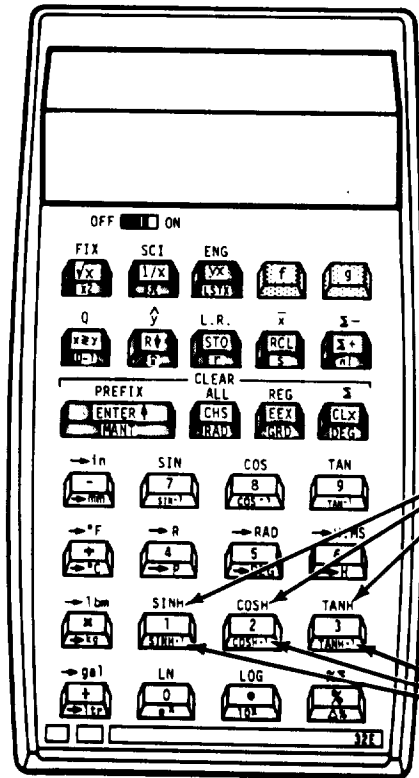


Key	Control or Indicator	Function
$\boxed{\text{SIN}^{-1}}$ , $\boxed{\text{COS}^{-1}}$ , $\boxed{\text{TAN}^{-1}}$	Arc Sine, Arc Cosine, Arc Tangent	Computes arc sine, arc cosine, or arc tangent of number in displayed X-register.



$\boxed{\text{RAD}}$	Radians	Sets radians mode for all trigonometric functions.
$\boxed{\text{GRD}}$	Grads	Sets grads mode for all trigonometric functions.
$\boxed{\text{DEG}}$	Degree	Sets decimal degrees mode for all trigonometric functions.
	To Radians	Converts decimal degrees to radians.
$\boxed{[-\text{DEG}]}$	To Degrees	Converts radians to decimal degrees.

Key	Control or Indicator	Function
$\rightarrow$ H.MS	Hours. Minutes Seconds	Converts decimal hours or degrees to hours, minutes, seconds or degrees, minutes, seconds.
$\square$ -H	To Decimal Hours or Degrees	Converts hours, minutes, seconds, or degrees, minutes, seconds to decimal hours or degrees.



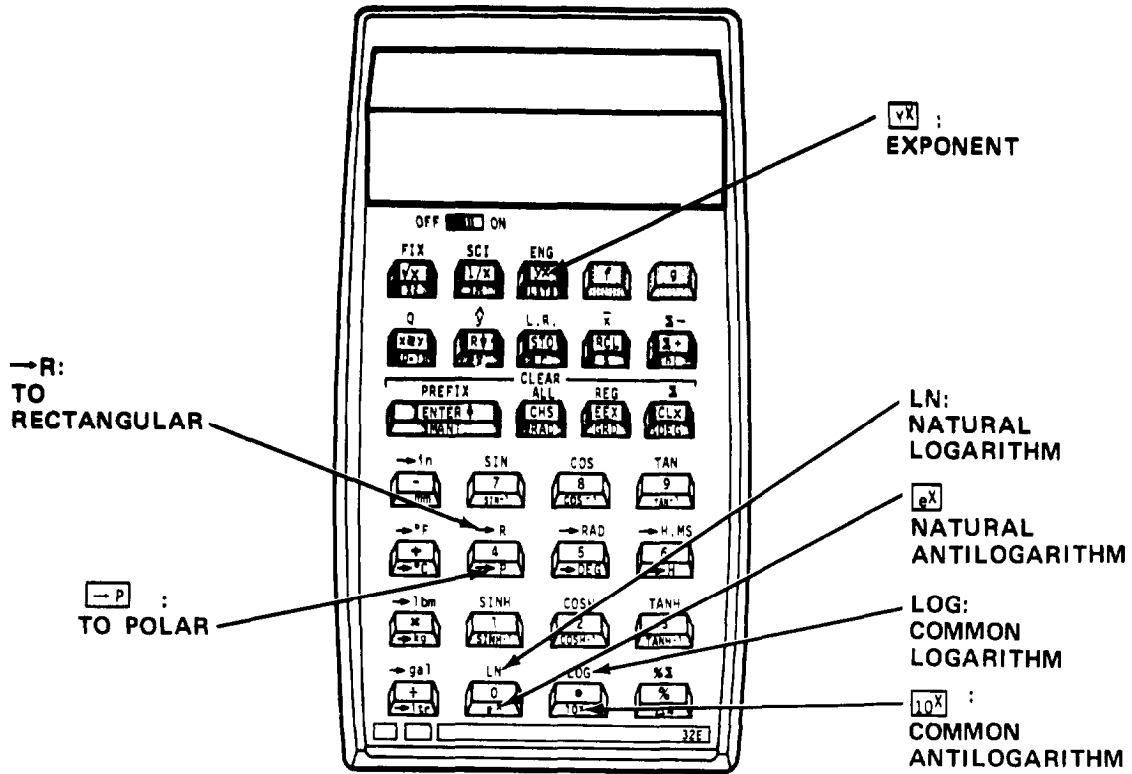
SINH, COSH, TANH:  
HYPERBOLIC SINE,  
COSINE, AND TANGENT

$\square$ SINH $^{-1}$   $\square$ COSH $^{-1}$   $\square$ TANH $^{-1}$   
INVERSE HYPERBOLIC SINE,  
COSINE, TANGENT

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Key	Control or Indicator	Function
Hyperbolic		
SINH, COSH, TANH	Hyperbolic Sine, Cosine, and Tangent	Computes hyperbolic sine, hyperbolic cosine, or hyperbolic tangent of number in displayed X- register.
$\boxed{\text{SINH}^{-1}}$ , $\boxed{\text{COSH}^{-1}}$ , $\boxed{\text{TANH}^{-1}}$	Inverse Hyperbolic Sine, Cosine, Tangent	Computes inverse hyper- bolic sine, inverse hyperbolic cosine, or inverse hyperbolic tangent of number in dis- played X-register.

Key	Control or Indicator	Function
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Logarithmic and Exponential

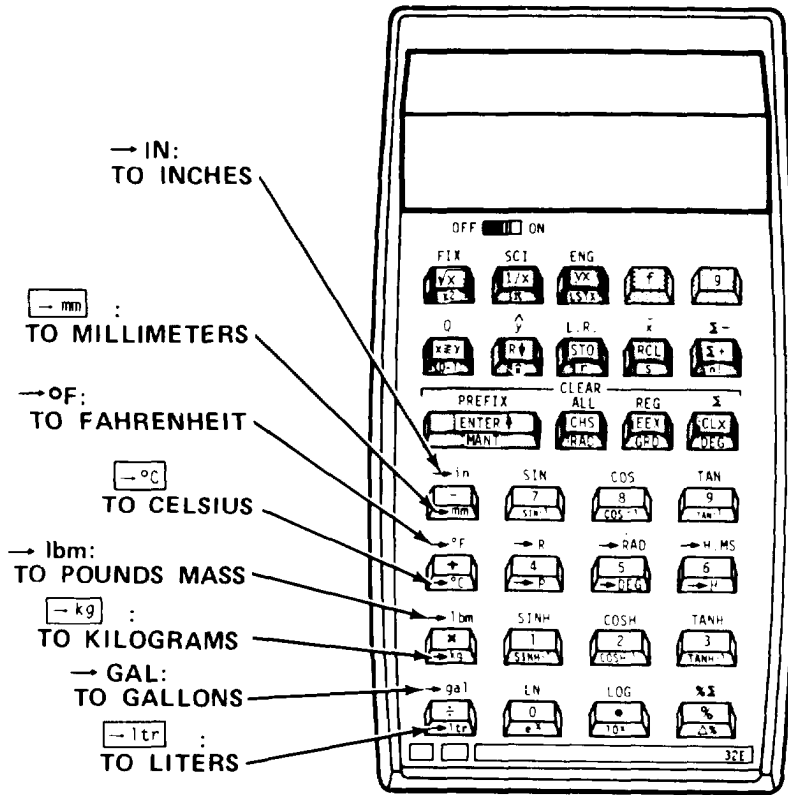
$y^x$	Exponent	Raises number in Y-register to power of number in displayed X-register.
LN	Natural Logarithm	Computes natural logarithm (base e) of number in displayed X-register.
$e^x$	Natural Antilogarithm	Raises e to power of number in displayed X-register.
LOG	Common Logarithm	Computes common logarithm (base 10) of number in displayed X-register.

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Key	Control or Indicator	Function
$10^x$	Common Antilogarithm	Raises 10 to power of number in displayed X-register.
$\rightarrow P$	To Polar	Converts rectangular (X,Y or coordinates in X- and Y - registers into polar (R, $\theta$ ) coordinates. Angle $\theta$ stored in Y-register.
$\rightarrow R$	To Rectangular	Converts polar R, $\theta$ ) coordinates in X- and Y-registers into rectangular (X, Y) coordinates.

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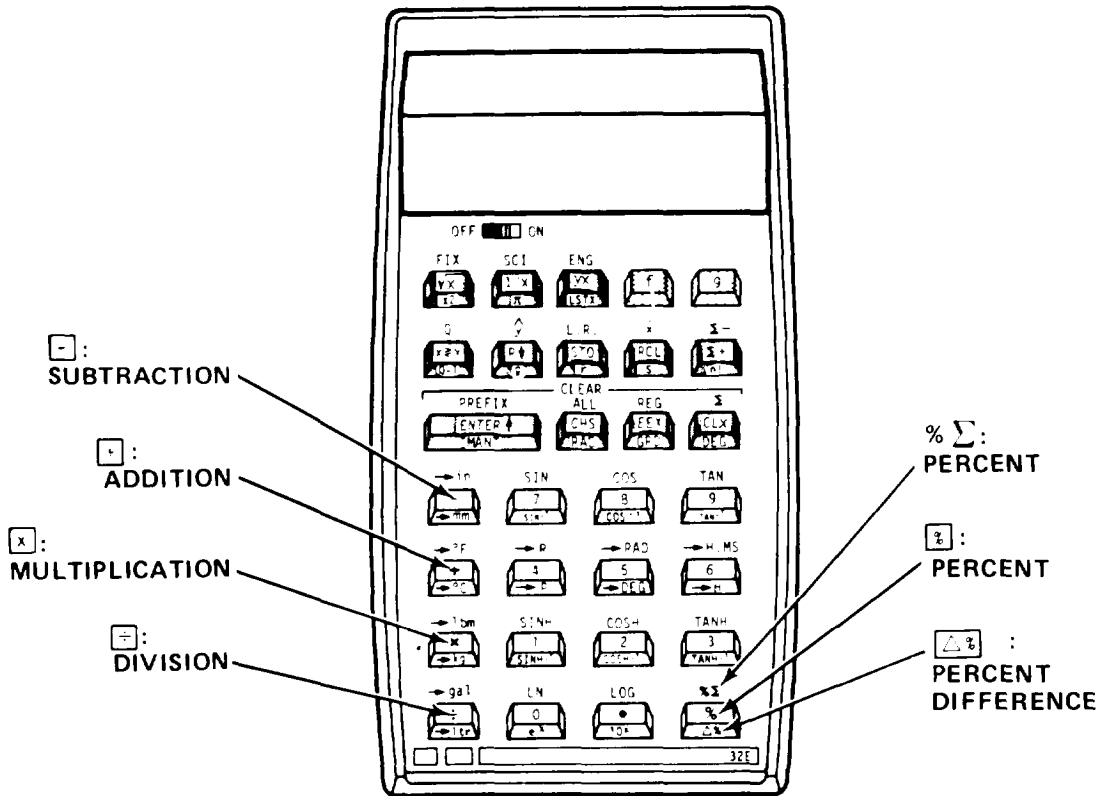
Key	Control or Indicator	Function
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Metric Conversions

→in	To Inches	Converts millimeters to inches.
-mm	To Millimeters	Converts inches to millimeters.
→°F	To Fahrenheit	Converts degrees Celsius to degrees Fahrenheit.
-°C	To Celsius	Converts degrees Fahrenheit to degrees Celsius.
→lbm	To Pounds Mass	Converts kilograms to pounds mass,
-kg	To Kilograms	Converts pounds mass to kilograms.

Key	Control or Indicator	Function
→ gal	To Gallons	Converts liters to gallons (U.S.).
← ltr	To Liters	Converts gallons (U.S.) to liters.



Percentage

	Percent	Computes X-percent of Y.
	Percent Difference	Computes percent difference between number in Y-register and number in X-register.
	Percent	Computes percent that X is of the number (∑ X) in storage register R <sub>n</sub> .

Arithmetic Functions

	Addition	Arithmetic functions
	Subtraction	
	Multiplication	
	Division	

## 6-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails to Operate. Trouble with proper equipment. Report any deficiencies using the proper forms. See DA Pam 738-750.

### 6-5.1 PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The "Equipment is Not Ready/Available If" column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.
- d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.
- e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.
- f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.
- g. Interval columns. This column determines the time period designated to perform your PMCS.
- h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.
- i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.



j. List of tools and materials required for PMCS is as follows.

<u>Item</u>	<u>Quantity</u>
Cheesecloth (Item 5, Appendix E)	ar

Table 6-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

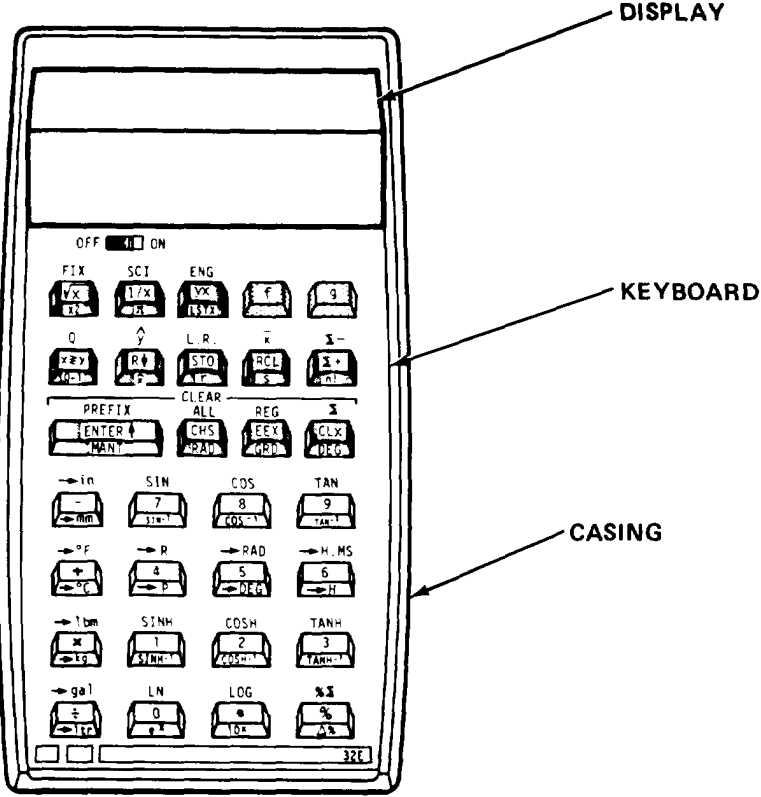
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
1	B	<p><u>POCKET CALCULATOR</u></p> <p>Inspect.</p>  <p>1. Check keyboard, display, and casing for cracks or breaks. Replace calculator if casing or display is cracked or broken.</p>	<p>Calculator keyboard, display, or casing is damaged.</p>

Table 6-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

		B - Before D - During A - After	W - Weekly M - Monthly Q - Quarterly	AN - Annually S - Semiannually BI - Biennially	(Number) - Hundreds of Hours	
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED			PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
		<b>POCKET CALCULATOR - Cont</b>				
1	B	<u>INSPECT - Cont</u>				
		2. Connect ac adapter/recharger to calculator and plug in. Turn calculator on. Press <b>[STO]</b> and <b>[ENTER]</b> Display should indicate -8, 8, 8, 8, 8, 8, 8, 8, 8, 8.				Display does not show - 8, 8,8, 8, 8, 8,8, 8, 8, 8.
		3. With battery pack in calculator, check operation to be sure calculator turns on. Remove battery pack and check for clean contacts. Wipe clean. Reinstall battery pack.				Battery pack is defective.
		4. Check power cord for kinks, frays or burns.				Power cord is damaged.

**6-6. OPERATION UNDER USUAL CONDITIONS.**

6-6.1 Operating Procedure.

- a. Selecting a function.

**NOTE**

Most keys on the keyboard perform three functions. One function is indicated by symbol on top of key, second is above key, and third is on slanted face of key.

(1) To select a function printed on the key, press the key.

(2) To select a function printed above the key, press key **[f]**, then function key.

Example: To use **LOG** in calculation, enter number, **[f]** then **LOG**.

(3) To select a function printed on slanted face of key, press **[g]** then function key.

Example: To use **[x<sup>2</sup>]** in calculations, enter number, **[g]** then **[x<sup>2</sup>]**.

b. Keying in numbers.

(1) Press keys corresponding to digits and decimal point in the order that they appear, reading from left to right.

(2) If needed, press  $\boxed{\text{CHS}}$  to make number negative.

c. One-number functions.

(1) Key in number on which operation is to be performed.

(2) Select desired function. Press key.

Example: To calculate square root of 5, press  $\boxed{5}$  and  $\boxed{\sqrt{x}}$ .

Answer is 2.2361.

d. Two-number functions.

(1) Key in first number.

(2) Press  $\boxed{\text{ENTER}}$  to separate first number from second number.

(3) Key in second number.

(4) Select desired function. Press key.

Example: To calculate 5 percent of 35, press  $\boxed{3}$ ,  $\boxed{5}$ ,  $\boxed{\text{ENTER}}$ ,  $\boxed{5}$ , and  $\boxed{\%}$ .

Answer is 1.75.

e. Exponent key  $\boxed{y^x}$ .

**NOTE**

Exponent key is two-number function.

(1) Key in number for Y. Press  $\boxed{\text{CHS}}$  if it is negative.

(2) Press  $\boxed{\text{ENTER}}$  to send number to Y register in automatic memory stack.

(3) Key in number for X (exponent for Y).

(4) Press  $\boxed{y^x}$  key.

Example: To calculate  $5^3$ , press  $\boxed{5}$ ,  $\boxed{\text{ENTER}}$ ,  $\boxed{3}$ , and  $\boxed{y^x}$ .

Answer is 125.

f. Chain calculations.

**NOTE**

Calculator uses reverse polar notation (RPN) logic for chain calculations.

(1) If equation has parenthetical expressions, key in numbers and perform function in first parenthesis. Key in first number, press **ENTER**, key in second number, and press function key for that operation.

(2) Key in numbers and perform function in second parenthesis. Key in first number, press **ENTER**, key in second number, then press function key for that operation.

(3) Press function key for operation indicated between parentheses.

Example: To calculate  $(3 \times 4) \times (5 + 6)$ , press

**3**, **ENTER**, **4**, and **x**  
**5**, **ENTER**, **6**, and **+**  
**x**; answer is 132.

g. Operations with powers of 10.

(1) Key in number being multiplied by power of 10. Press **CHS** if number is negative.

(2) Press **EEX**.

(3) Key in exponent (power) of 10. Press **CHS** if exponent is negative.

(4) press **ENTER**, and key in exponent.

(5) Press **x**.

Example: To multiply  $15.6 \times 10^{12}$  by 25 press

**1**, **5**, **.**, **6**, **EEX**, and **12**  
**ENTER**, **25**, and **x**; answer is  $3.9000 \times 10^{14}$ .

h. Storage (memory) register arithmetic.

**NOTE**

This procedure performs two-number arithmetic functions on number stored in storage register. The displayed X-register is the second number.

(1) Press **STO**.

(2) press appropriate function key **+**, **-**, **x**, or **÷**.

(3) Press **0** through **8** or **.0** through **.5**, indicating on which register function will be performed.

Example: Pressing  $\boxed{\text{STO}}$   $\boxed{\times}$  , and  $\boxed{1}$  multiplies value of (displayed) X-register by contents of storage (memory) register 1. The answer is placed into storage (memory) register 1.

**NOTE**

Value of X-register will not be changed.

i. Clearing storage (memory) register.

(1) To clear single storage (memory) register, press  $\boxed{0}$  ,  $\boxed{\text{STO}}$  , and location of register to be cleared.

Example: To clear register 2, press  $\boxed{0}$  ,  $\boxed{\text{STO}}$  , and  $\boxed{2}$  .

(2) To clear registers 0 through 8, press  $\boxed{f}$  and REG. To clear registers 0 through 5, press  $\boxed{f}$  and  $\boxed{\cdot}$   $\boxed{\cdot}$  to clear all registers (including the automatic memory stack) press  $\boxed{f}$  and ALL.

j. Trigonometric functions.

(1) Enter or calculate value of X, number on which trigonometric function is to be performed.

(2) Press  $\boxed{g}$  key.

(3) Press  $\boxed{\text{DEG}}$  ,  $\boxed{\text{RAD}}$  , or  $\boxed{\text{GRD}}$  to select measurement for answer (degrees, radians, or grads).

(4) Press  $\boxed{f}$  key.

(5) Press needed function (SIN, COS, TAN) key.

Example: To calculate sine 35 , press  $\boxed{3}$  ,  $\boxed{5}$  ,  $\boxed{g}$  ,  $\boxed{\text{DEG}}$  ,  $\boxed{f}$  , and SIN. Answer is 0.5736.

k. Polar/rectangular coordinate conversion.

(1) Convert from rectangular (X, Y) to polar coordinates.

**NOTE**

Value for Y is always keyed in first.

(a) Key in value of Y.

(b) Press  $\boxed{\text{ENTER}}$  .

(c) Key in value of X.

(d) Press  $\square$  then key in  $\square$ ,  $\square$ , or  $\square$  to select measurement for answer (degrees, radians, or grads).

(e) Press  $\square$  and  $\square$  to get R (magnitude). Press  $\square$  to get angle in radians.

Example: To convert rectangular coordinates 4, 3 to polar with angle in radians, press

$\square$ ,  $\square$ , and  $\square$   
 $\square$  and  $\square$   
 $\square$  and  $\square$ ; answer is 5.  
 $\square$ ; answer is .64.

(2) Convert from polar to rectangular coordinates.

(a) Key in angle in radians.

(b) Press  $\square$ .

(c) Key in value of R (magnitude).

(d) Press  $\square$  then key in  $\square$ ,  $\square$ , or  $\square$  to select measurement of angle (degrees, radians, or grads).

(e) Press  $\square$ , R to get X. Press  $\square$  to get Y.

Example: To convert polar coordinates 5 and .64 to rectangular, press

$\square$ ,  $\square$ ,  $\square$ ,  $\square$ , and  $\square$   
 $\square$  and  $\square$   
 $\square$  and  $\square$ ; answer is 4.01.  
 $\square$ ; answer is 2.986.

## 1. Statistical functions.

(1) Accumulations.

(a) Pressing  $\square$  key computes sums and products of the values in the X- and Y-registers. Results are automatically accumulated in storage registers  $R_0$  through  $R_5$ . Before starting to calculate accumulations with a new set of x and y values, clear registers by pressing  $\square$  **REG**.

Key y value into X-register.

Press  $\square$  to raise y value into Y-register.

Key x value into X-register.

Press  $\square$ .

(b). If statistical problem involves only one variable (x), clear storage registers R.0 through R.5 and Y-register. press  $\boxed{f}$ ,  $\Sigma$ , and  $\boxed{\text{ENTER}}$ .

Key number into X-register.

Press  $\boxed{\Sigma+}$ .

**NOTE**

Unlike storage register arithmetic, the accumulation operation allows overflows (i.e., number whose magnitudes are greater than  $9.99999999 \times 10^{99}$ ) in storage registers R.0 through R.5 without indicating Error 1 in the display.

(c). To use any of the accumulations, recall contents of desired storage register into displayed X-register by pressing  $\boxed{\text{RCL}}$   $\boxed{-}$  followed by the number of the register. If this is done immediately after pressing  $\boxed{\Sigma+}$  or  $\Sigma-$ , the accumulation recalled is written over the number of data pair entries (n) in the display. To use both  $\Sigma x$  and  $\Sigma y$ , press  $\boxed{\text{RCL}}$   $\boxed{\Sigma+}$ . This simultaneously copies  $\Sigma x$  from R.1 into displayed X-register and  $\Sigma y$  from R.3 into Y-register. If this is done immediately after pressing  $\boxed{+}$ ,  $\Sigma-$ ,  $\boxed{\text{CLX}}$ , or  $\boxed{\text{ENTER}}$  the number in the Y-register is first lifted into the Z-register. Otherwise, the numbers in the X- and Y-registers are first lifted into Z- and T- registers, respectively.

Example: To find  $\Sigma x, \Sigma x^2, \Sigma y, \Sigma y^2,$  and  $\Sigma xy$  for the paired values of x and y listed below, press

y	7	5	9
x	5	3	8

Keystrokes	Display	
$\boxed{f}$ CLEAR $\Sigma$	0.0000	Clear statistical storage registers. (Display shown assumes no results remain from previous calculations.)
$\boxed{7}$ $\boxed{\text{ENTER}}$	7.0000	
$\boxed{5}$ $\boxed{\Sigma+}$	1.0000	First pair is accumulated: n=1
$\boxed{5}$ $\boxed{\text{ENTER}}$	5.0000	
$\boxed{3}$ $\boxed{\Sigma+}$	2.0000	Second pair is accumulated: n=2
$\boxed{9}$ $\boxed{\text{ENTER}}$	9.0000	
$\boxed{8}$ $\boxed{\Sigma+}$	3.0000	Third pair is accumulated: n=3



<u>Keystrokes</u>	<u>Display</u>	
RCL $\cdot$ 1	16.0000	Sum of x values from register R.1.
RCL $\cdot$ 2	98.0000	Sum of squares of x values from register R.2.
RCL $\cdot$ 3	21.0000	Sum of y values from register R.3.
RCL $\cdot$ 4	155.0000	Sum of squares of y values from register R.4.
RCL $\cdot$ 5	122.0000	Sum of products of x and y values from register R.5.
RCL $\cdot$ 0	3.0000	Number of entries (n=3) from register R.0

(2) Deleting and correcting data.

(a) If an incorrect value is keyed in and  $\Sigma^+$  has not yet been pressed, press  $\text{CLX}$  and key in correct value.

(b) To change one of the values, or if after pressing one of the values was erroneous, correct the accumulations by using  $\Sigma^-$  (summation minus) key as follows:

Key incorrect data pair into X- and Y-registers.  
 $\text{LSTX}$  can be used to return a single incorrect data value to displayed X-register.

Press  $\text{f} \Sigma^-$  to delete incorrect data.

Key in correct values for x and y. If one value of an (x, y) data pair is incorrect, both values must be deleted and reentered.  
 press  $\Sigma^+$ .

Example: If last data pair (8, 9) in previous example should have been (8, 6), correct the accumulation as follows, press

<u>Keystrokes</u>	<u>Display</u>	
9 ENTER	9.0000	Incorrect y value is entered again.
8	8.	Correct x value is entered again.
$\text{f} \Sigma^-$	2.0000	Number of entries (n) is now two.

<u>Keystrokes</u>	<u>Display</u>	
<b>6</b> <b>ENTER</b>	6.0000	Correct y value is entered.
<b>8</b>	8.	x value is entered again.
<b>Σ+</b>	3.0000	Number of entries is again three.

(3) Mean. Pressing **Σ<sub>xy</sub>** computes the arithmetic mean (average) of x and y values accumulated in registers R.1 and R.3 respectively.

Pressing **f** **Σ<sub>x</sub>** causes the following operations to be performed.

The contents of the stack registers are lifted just as they are when pressing **RCL**.

The mean of the x values ( $\hat{x}$ ) is calculated using data accumulated in registers R.1 ( $\sum x$ ) and R.0 (n). The resulting value for x appears in displayed X-register.

The mean of y values ( $\hat{y}$ ) is calculated using data accumulated in registers R.3 ( $\sum y$ ) and R.0 (n).

The resulting value for y is available in Y-register of stack.

Example: Below is a chart of daily high and low temperatures for a winter week.

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
High	6	11	14	12	5	-2	-9
Low	-22	-17	-15	-9	-24	-29	-35

To find average high and low temperatures for week selected, press;

<u>Keystrokes</u>	<u>Display</u>	
<b>f</b> <b>CLEAR</b> <b>Σ+</b>	0.0000	Statistical registers cleared. (Display shown assumes no results remain from previous calculations.)
<b>6</b> <b>ENTER</b>	22    22.	
<b>CHS</b> <b>Σ+</b>	1.0000	Number of data pairs (n) is now 1.
11 <b>ENTER</b>	17    17.	
<b>CHS</b> <b>Σ+</b>	2.0000	Number of data pairs (n) is now 2.
14 <b>ENTER</b>	15    15.	

$\boxed{\text{CHS}}$	$\boxed{\Sigma+}$	3.0000	
12	$\boxed{\text{ENTER}}$	$\boxed{9}$	9.
$\boxed{\text{CHS}}$	$\boxed{\Sigma+}$	4.0000	
$\boxed{5}$	$\boxed{\text{ENTER}}$	24	24.
$\boxed{\text{CHS}}$	$\boxed{\Sigma+}$	5.0000	
$\boxed{2}$	$\boxed{\text{CHS}}$	$\boxed{\text{ENTER}}$	-2.0000
29	$\boxed{\text{CHS}}$	$\boxed{\Sigma+}$	6.0000
$\boxed{9}$	$\boxed{\text{CHS}}$	$\boxed{\text{ENTER}}$	-9.0000
35	$\boxed{\text{CHS}}$	$\boxed{\Sigma+}$	7.0000
			Number of data pairs (n) is now 7.
$\boxed{f}$	$\boxed{A}$	$\boxed{x}$	-21.5714
			Average low temperature.
$\boxed{X \rightleftharpoons Y}$			5.2857
			Average high temperature.

(4) Standard deviation.

(a) Pressing  $\boxed{S}$  computes the standard deviation (a measure of dispersion around the mean) of accumulated data.

(b) When  $\boxed{9} \boxed{S}$  is pressed:

The contents of stack registers are lifted just as they are when pressing  $\boxed{\text{RCL}}$   $\boxed{\Sigma+}$ .

The standard deviation of x values ( $s_x$ ) is calculated using data accumulated in registers R.2 (2), R.1 ( $\Sigma$ ), and R.0 (n). The result appears in displayed X-register.

The standard deviation of y values ( $s_y$ ) is calculated using data accumulated in registers R.4 ( $y^2$ ), R.3 (y), and R.0 (n). The result appears in Y-register.

Example: To determine the standard deviation of the following test scores: 79, 94, 68, 82, 78, 83, and 89, press

<u>Keystrokes</u>	<u>Display</u>	
$\boxed{f}$ CLEAR ALL	0.0000	Clear statistical registers and Y-register for new, one-variable problem.

<u>Keystrokes</u>	<u>Display</u>	
79 $\Sigma^+$	1.0000	First score is entered. Since this problem involves only one variable, y-value does not have to be entered into Y-register using the $\text{ENTER}$ key.
94	2.0000	Display shows number of scores entered so far.
68 $\Sigma^+$	3.0000	
86 $\Sigma^+$	4.0000	
82 $\Sigma^+$	5.0000	
78 $\Sigma^+$	6.0000	
83 $\Sigma^+$	7.0000	
89 $\Sigma^+$	8.0000	Last score in sample.
$\text{g}$ $\text{s}$	7.8365	Standard deviation of test scores.

(5) Linear regression. Linear regression is a statistical method for finding a straight line that best fits a set of data points, thus providing a relationship between two variables.

(a) To use the linear regression function, first key in a series of data points using the  $\Sigma^+$  key. Then press  $\text{f}$  L.R.

(b) When  $\text{f}$  L.R. is pressed:

The contents of the stack registers are lifted just as they are when you press  $\text{RCL}$   $\Sigma^+$  .

The slope (A) of the least squares line of the data is available in the Y-register of the stack.

The y-intercept (B) of the least squares line of the data appears in the displayed X-register of the stack.

(c) To use value for A or to bring it into displayed X-register, simply shift stack contents with the  $\text{x}\leftrightarrow\text{y}$  key .

**Example:** An oil company wishes to know the slope and y-intercept of a least squares for the consumption of motor fuel in the United States against time since 1945. It knows the data given in the table.

Motor Fuel Demand (Millions of Barrels)	696	994	1330	1512	1750	2162	2243	2382	2484
--	-----	-----	------	------	------	------	------	------	------

---

Year	1945	1950	1955	1960	1965	1970	1971	1972	1973
------	------	------	------	------	------	------	------	------	------

Solution: Key the data into the calculator using the  $\Sigma^+$  key, then press  $\square$  L.R.

<u>Keystrokes</u>	<u>Display</u>
-------------------	----------------

$\square$  CLEAR<sub>CLEAR</sub>  $\Sigma^+$

0.0000

Clear statistical storage registers. (Display shown assumes no results remain from previous calculations).

6 9 6  $\square$  ENTER  $\square$

696.0000

1945  $\Sigma^+$

1.0000

994  $\square$  ENTER  $\square$

994.0000

1950  $\Sigma^+$

2.0000

1330  $\square$  ENTER  $\square$

1,330.0000

1955  $\Sigma^+$

3.0000

1512  $\square$  ENTER  $\square$

1,512.0000

1960  $\Sigma^+$

4.0000

1750  $\square$  ENTER  $\square$

1,750.0000

1965  $\Sigma^+$

5.0000

2162  $\square$  ENTER  $\square$

2,162.0000

1970  $\Sigma^+$

6.0000

2243  $\square$  ENTER  $\square$

2,243.0000

1971  $\Sigma^+$

7.0000

2382  $\square$  ENTER  $\square$

2,382.0000

1972  $\Sigma^+$

8.0000

2484  $\square$  ENTER  $\square$

2,484.0000

1973  $\Sigma^+$

9.0000

All data pairs have been keyed in.

<u>Keystrokes</u>	<u>Display</u>	
$\boxed{f}$ L . R .	-118,290.6295	The y-intercept of the line.
$\boxed{x \approx y}$	61.1612	Slope of the line.

(6) Linear estimation. With data accumulated in registers R.0 through R.5 a predicted value for y (denoted  $\hat{y}$ ) can be calculated by keying in a new value for x and pressing  $\boxed{f} \hat{y}$ . A predicted value for x (denoted  $\hat{x}$ ) can be calculated by keying in a new value for y and pressing  $\boxed{g} \hat{x}$ .

Example: With data intact from previous example in registers R.0 through R.5 to predict demand for motor fuel for the years 1980 and 2000, key in new x values and press  $\boxed{f} \hat{y}$ . To determine the year that the demand for motor fuel is expected to pass 3,500 million barrels, key in 3,500 (new value for y) and press  $\boxed{g} \hat{x}$ .

<u>Keystroke</u>	<u>Display</u>	
1980 $\boxed{f} \hat{y}$	2,808.6264	Predicted demand in millions of barrels for the year 1980.
2000 $\boxed{f} \hat{y}$	4,031.8512	Predicted demand in millions of barrels for the year 2000.
35 $\boxed{g} \hat{x}$	1,991.3041	The demand is expected to pass 3,500 million barrels during 1992.

(7) Correlation coefficient. Both linear regression and linear estimation presume that the relationship between x and y data values can be approximated, to some degree, by a linear function (a straight line).  $\boxed{r}$  (correlation coefficient) can be used to determine how closely the data "fits" a straight line. The correlation coefficient can range from  $r = + 1$  to  $r = -1$ . At  $r = + 1$ , data falls exactly onto a straight line with positive slope. While at  $r = -1$ , data falls exactly onto a straight line with negative slope. At  $r = 0$ , data cannot be approximated by a straight line.

Example: To calculate the correlation coefficient for previous example press:

<u>Keystrokes</u>	<u>Display</u>	
$\boxed{g} \boxed{r}$	0.9931	The data very closely approximates-a straight line.

**6-7. OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.

### Section III. OPERATOR MAINTENANCE

**6-8. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**6-9. TROUBLESHOOTING PROCEDURES.**

a. The table lists the common malfunctions which you may find during the operation or maintenance of the pocket calculator or its components. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

**Table 6-2. TROUBLESHOOTING**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. CALCULATOR DISPLAY IS BLANK.	<p>Step 1. Plug in ac adapter/recharger. Turn calculator on.</p> <p>(a) If display of zeros comes on, proceed to step 2.</p> <p>(b) If display is blank, replace adapter/recharger.</p> <p>(c) If problem remains, replace calculator.</p> <p>Step 2. Check for raised decimal point at far left corner of display. Indicates low power condition.</p> <p>(a) If indicator is on, proceed to step 3.</p> <p>(b) If indicator is off, recharge battery pack.</p> <p>Step 3. Check to see if contacts are dirty.</p> <p>(a) Clean contacts on inside of calculator and battery pack with cotton swab (Item 6, Appendix E) moistened with alcohol (Item 3, Appendix E).</p> <p>(b) Replace battery pack. Open battery pack door. Remove defective battery pack. Install new battery pack. Reinstall battery pack door.</p>	

Table 6-2. TROUBLESHOOTING - Cont

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

2. CALCULATIONS OR DISPLAY ERRATIC.

Step 1. Check for raised decimal point at far left corner of display. Indicates low power condition.

- (a) Recharge battery pack.
- (b) Replace battery pack.
- (c) Replace calculator.

Step 2. Press STO and ENTER to see if display shows -8,8,8,8,8,8,8,8, not ERROR 9.

If ERROR 9 is displayed, replace calculator.

**NOTE**

For error conditions refer to operator's instructions for the HP-32E provided with equipment.

**6-10. MAINTENANCE PROCEDURES.** There are no operator maintenance procedures assigned for this equipment.

**Section IV ORGANIZATIONAL MAINTENANCE**

**6-11. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**6-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT,** These items are not required at the organizational level of maintenance.



**6-13. SERVICE UPON RECEIPT.****6-13.1 Checking Unpacked Equipment.**

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

**6-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

**6-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.** There are no organizational troubleshooting procedures assigned for this equipment.

**6-16. MAINTENANCE PROCEDURES.** There are no organizational maintenance procedures assigned for this equipment.

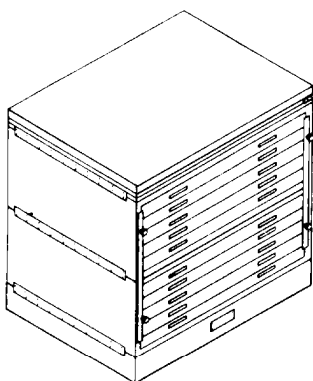
**6-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE**

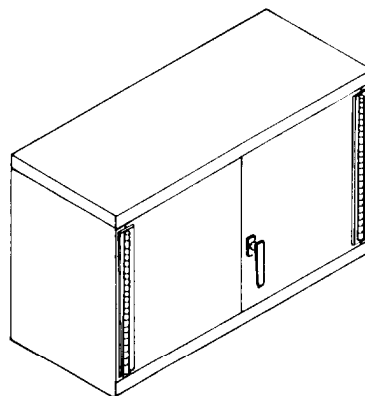
There are no direct/general support maintenance procedures assigned for this equipment.







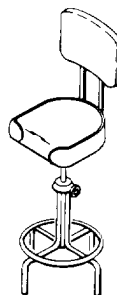
**MAP AND PLAN  
FILING CABINET**



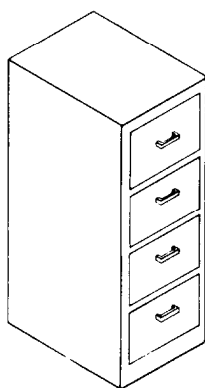
**WALL  
STORAGE  
CABINET**



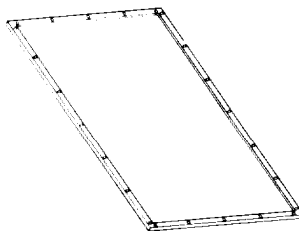
**FOLDING  
CHAIR**



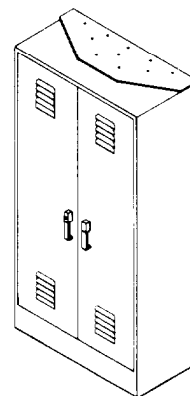
**ROTARY  
DRAFTING  
CHAIR**



**FILING  
CABINET**



**CORKBOARD**



**SUPPLY  
CABINET**

**CHAPTER 7**  
**FURNITURE AND CABINETS**

**Section I INTRODUCTION**

**7-1. GENERAL INFORMATION.**

7-1.1 Scope. This chapter contains the description of all furniture and cabinets contained in this section.

**7-2. EQUIPMENT DESCRIPTION.**

a. Map and Plan Filing Cabinet. Used for flat, horizontal storage of maps, blueprints, charts and plans of various sizes. The drawers are held shut by two locking bars located on either side of the front of the cabinet. A drawing board is mounted to the top of the cabinet for use as a work surface. Dimensions:

Width	40.75 in. (103.5 cm)
Depth	28.62 in. (72.7 cm)
Height	41.68 in. (105.7 cm)

b. Filing Cabinet. Used for the storage of legal-sized documents, correspondence and office supplies. There are four drawers. Dimensions:

Width	18.25 in. (46.36 cm)
Depth	26.63 in. (67.64 cm)
Height	52.0 in. (132 cm)

c. Wall Storage Cabinet. Used for miscellaneous storage. There are two shelves. The two doors are held shut by a handle-type latch. Dimensions:

Width	30.0 in. (76.2 cm)
Depth	12.0 in. (30.5 cm)
Height	18.0 in. (45.7 cm)

d. Supply Cabinet. Provides storage for miscellaneous items. Cabinet has two louvered doors with a built-in latch and five shelves. Dimensions:

Width	36.0 in. (91.4 cm)
Depth	18.0 in. (45.7 cm)
Height	72.0 in. (182.8 cm)

e. Rotary Drafting Chair. Provides seating for drafting personnel. It has adjustable seat height and back position. Dimensions:

Width	17.12 in. (43.5 cm)
Depth	17.12 in. (43.5 cm)
Height	42 in. (107 cm), Max 36 in. (91.4 cm), Min

f. Folding Chair. Provides general seating. Folds flat for storage. Dimensions:

Width	18 in. (45.7 cm)
Depth	20 in. (50.8 cm)
Height	32 in. (81.3 cm)

g. Corkboard. Wall mounted. Dimensions:

Width	30.0 in (76.2 cm)
Height	18.0 in (45.7 cm)

**7-3. TECHNICAL PRINCIPLES OF OPERATION.** There are no specific principles of operation for this equipment.

## Section II OPERATING INSTRUCTIONS

**7-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.** This equipment has no operator's controls or indicators.

**7-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no operator PMCS procedures assigned for this equipment.

**7-6. OPERATION UNDER USUAL CONDITIONS.**

7-6.1 Preparation for Movement. Ensure that portable equipment is properly secured with tiedowns provided.

**7-7. OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.

### Section III OPERATOR MAINTENANCE

**7-8. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**7-9. TROUBLESHOOTING PROCEDURES.** There are no operator troubleshooting procedures assigned for this equipment.

**7-10. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering operator maintenance functions for the furniture and cabinets. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

7-10.1 Inspect Furniture and Cabinets. Inspect furniture and cabinets for structural damage, rust and proper operation of all latches, hinges, drawer slides and adjustment mechanisms.

### Section IV ORGANIZATIONAL MAINTENANCE

**7-11. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**7-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

7-12.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

7-12.2 Special Tools; Test, Measurement, and Diagnostic Equipment; and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

7-12.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-321-24P covering organizational maintenance for this equipment.

**7-13. SERVICE UPON RECEIPT.**

7-13.1 Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

**7-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

**7-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.** There are no organizational troubleshooting procedures assigned for this equipment.

**7-16. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering organizational maintenance functions for the furniture and cabinets. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Door Latch (Wall Storage Cabinet) . . . . .	7-16.1
Replace Hinge (Piano Hinge) . . . . .	7-16.2
Remove/Install Map and Plan Filing Cabinet/Portable Drawing Board Assembly. . . . .	7-16.3
Remove/Install Wall Storage Cabinet . . . . .	7-16.4
Remove/Install Supply Cabinet . . . . .	7-16.5
Remove/Install Filing Cabinet . . . . .	7-16.6
Remove/Install Corkboard . . . . .	7-16.7

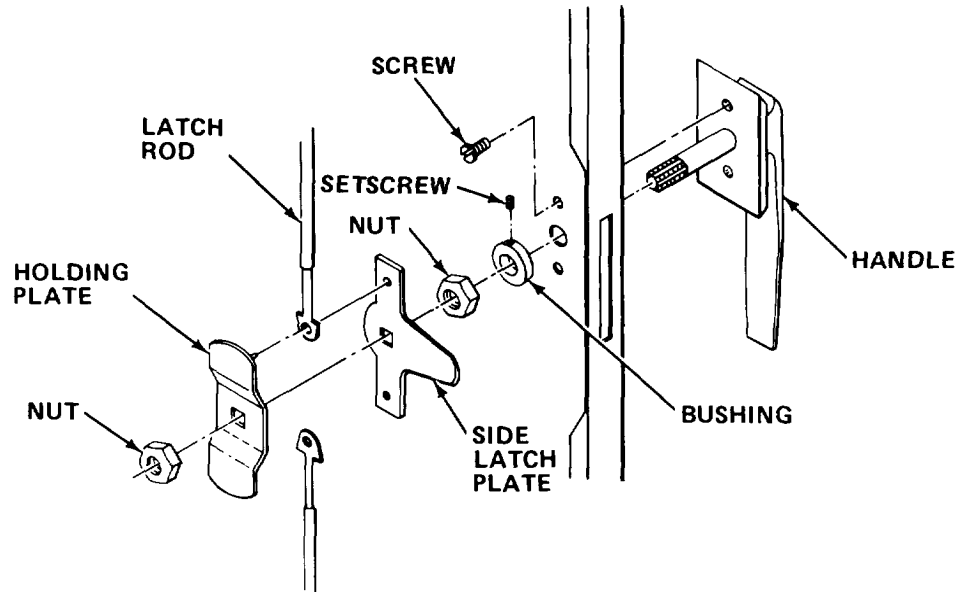


7-16.1 Replace Door Latch (Wall Storage Cabinet).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 9/16 in. Combination Wrench  
Flat Tip Screwdriver

SUPPLIES: Handle Type Latch



- a. Remove holding plate retaining nut.
- b. Remove holding plate and latch rods.
- c. Remove side latch plate.
- d. Remove handle retaining nut.
- e. Loosen setscrew and remove bushing from handle shaft.
- f. Remove two handle retaining screws and remove handle.
- g. Install new handle and secure with two screws.
- h. Reinstall bushing on handle shaft and tighten setscrew.
- i. Reinstall handle retaining nut.
- j. Reinstall side latch plate.
- k. Reinstall latch rod holding plate and latch rods.
- l. Reinstall holding plate retaining nut.

7-16.2 Replace Door Hinge (Piano Hinge).

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 1/4 in. Electric Drill  
5/32 in. Drill Bit  
Pop Rivet Gun

SUPPLIES: Piano Hinge  
5/32 in. Pop Rivets  
8-32 x 1/2 in. Screws (4 required)  
8-32 Nuts (4 required)

- a. Drill out rivets holding hinge to cabinet and remove hinge.
- b. Install new hinge and temporarily secure with four screws and nuts.
- c. Close and latch cabinet door and install pop rivets.
- d. Remove temporarily installed screws and nuts, and install remaining pop rivets.

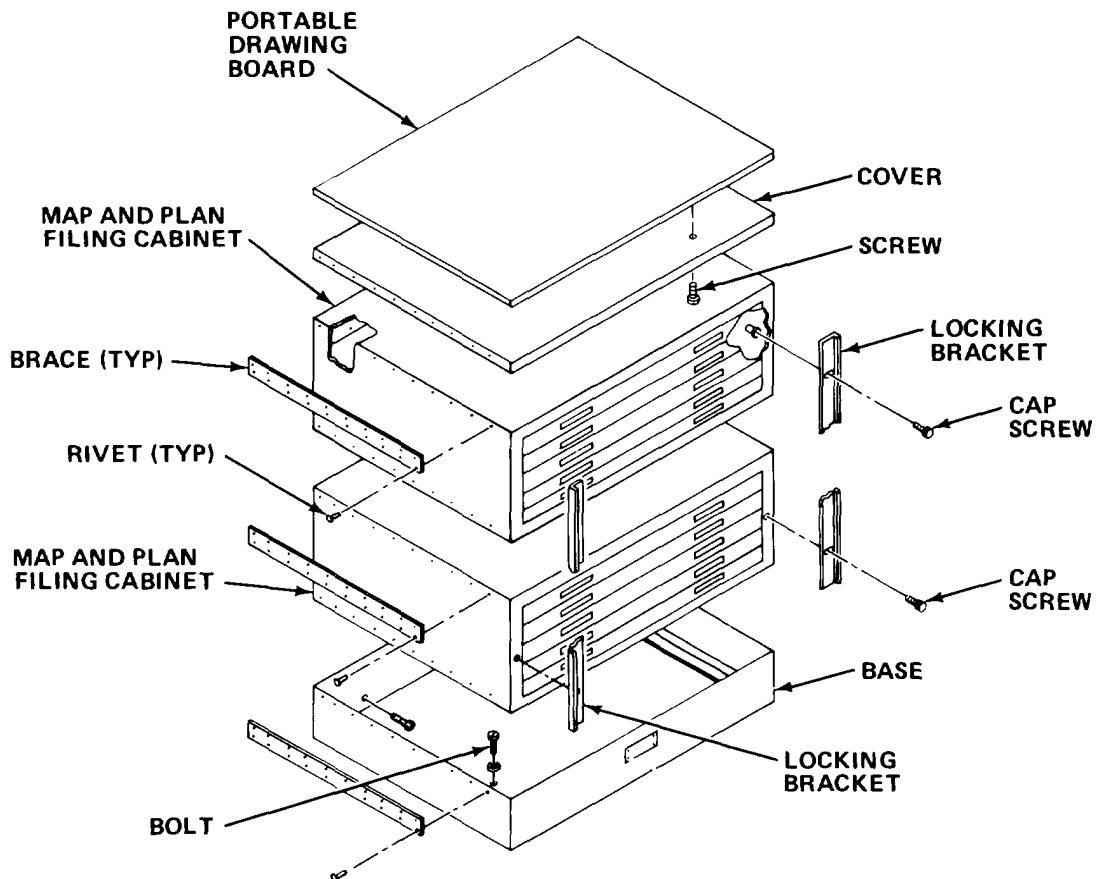
7-16.3 Remove/Install Map and Plan Filing Cabinet/Portable Drawing Board Assembly.

MOS: 83FJ6, Reproduction Equipment Repairer

PERSONNEL: Two persons are required to perform this procedure.

TOOLS: Rivet Gun  
Drill and Bits  
Flat Tip Screwdriver

SUPPLIES: Portable Drawing Board  
Map and Plan Filing Cabinet  
Rivets (2 bx)



- a. Remove filing cabinet (paragraph 7-16.6).
- b. Drill rivets from braces and remove braces.
- c. Remove map and plan filing cabinet cover, turn cover over, remove screws and portable drawing board from cover. Retain screws for re-use.

- d. Remove knurled screws from locking bracket on each side of front, Then remove locking bracket.

**WARNING**

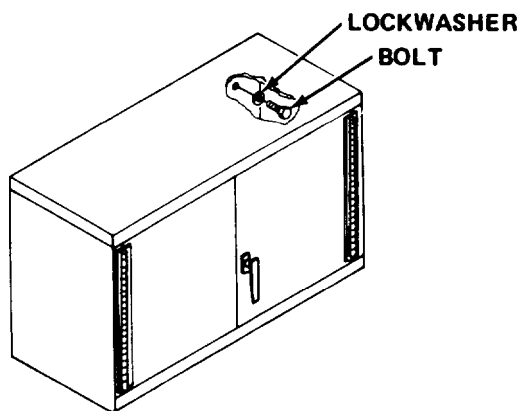
Serious personal injury can result if an inadequate number of personnel are used to move the map and plan filing cabinet.

- e. Lift top and bottom sections free from base.
- f. Remove screws and base from floor. Retain screws for re-use.
- g. Install new base, and both top and bottom sections of map and plan filing cabinet.
- h. Reinstall base to floor and secure with screws.
- i. Reinstall bottom section to base and rivet braces to base and bottom sections.
- j. Reinstall top section on bottom section and rivet braces to both top and bottom sections.
- k. Reinstall portable drawing board on cover and secure with screws.
- l. Reinstall cover on top section and rivet braces to both the cover and top section.
- m. Reinstall locking brackets and secure with knurled screws.

#### 7-16.4 Remove/Install Wall Storage Cabinet.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 1/2 in. Socket, 1/2 in. Drive  
1/2 in. Drive Ratchet  
1/2 in. Socket Extension, 2 in. long



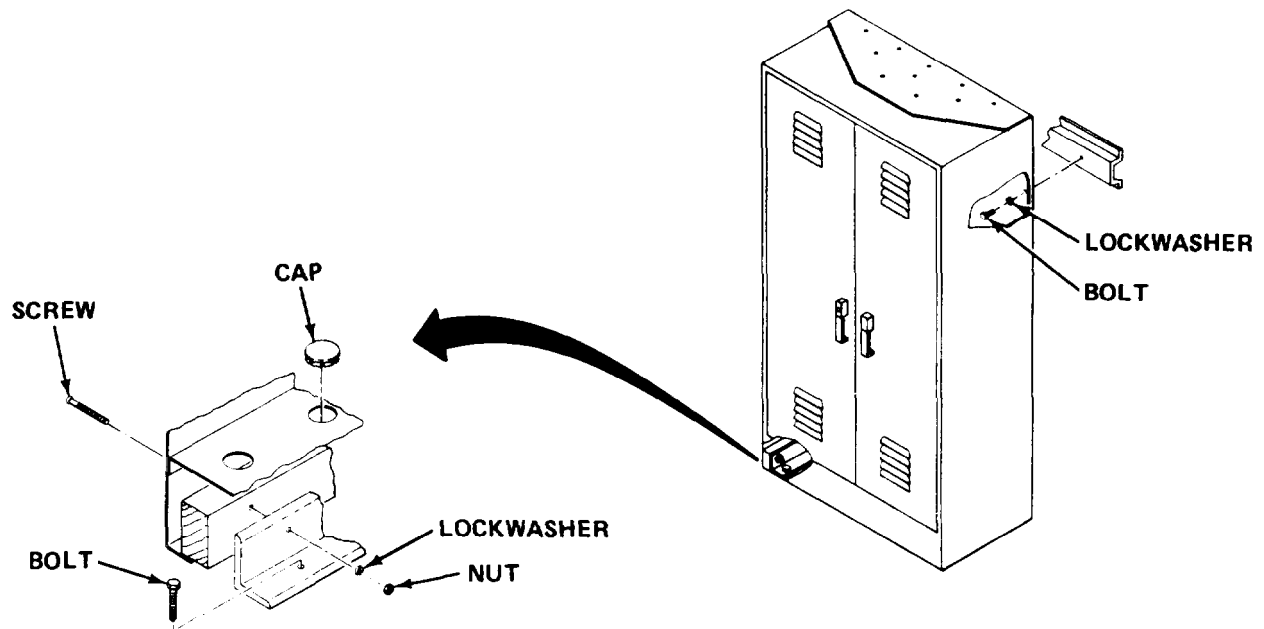
- a. Remove bolts and lockwashers which secure cabinet to wall.
- b. Remove defective cabinet.
- c. Install new cabinet and secure to wall with lockwashers and bolts.

7-16.5 Remove/Install Supply Cabinet.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: 1/4 in. Socket Set  
1/4 in. Socket Extension, 6 in. long  
11/32 in. Combination Wrench  
Cross Tip Screwdriver

SUPPLIES: Supply Cabinet



- a. Remove bolts and washers holding cabinet to wall.
- b. Remove caps and lag bolts holding mounting bracket to floor and remove cabinet.
- c. Remove screws, lockwashers, nuts, mounting bracket, and spacer from cabinet. Retain mounting bracket and spacers for use on new cabinet.
- d. Position spacers and mounting bracket on new cabinet. Install but do not tighten screws, lockwashers, and nuts.
- e. Place new cabinet in position and install, but do not tighten lag bolts.
- f. Secure cabinet to wall with lockwashers and bolts.
- g. Tighten the bracket retaining bolts and nuts.
- h. Tighten the bolts holding the mounting bracket to the floor, and install the caps.

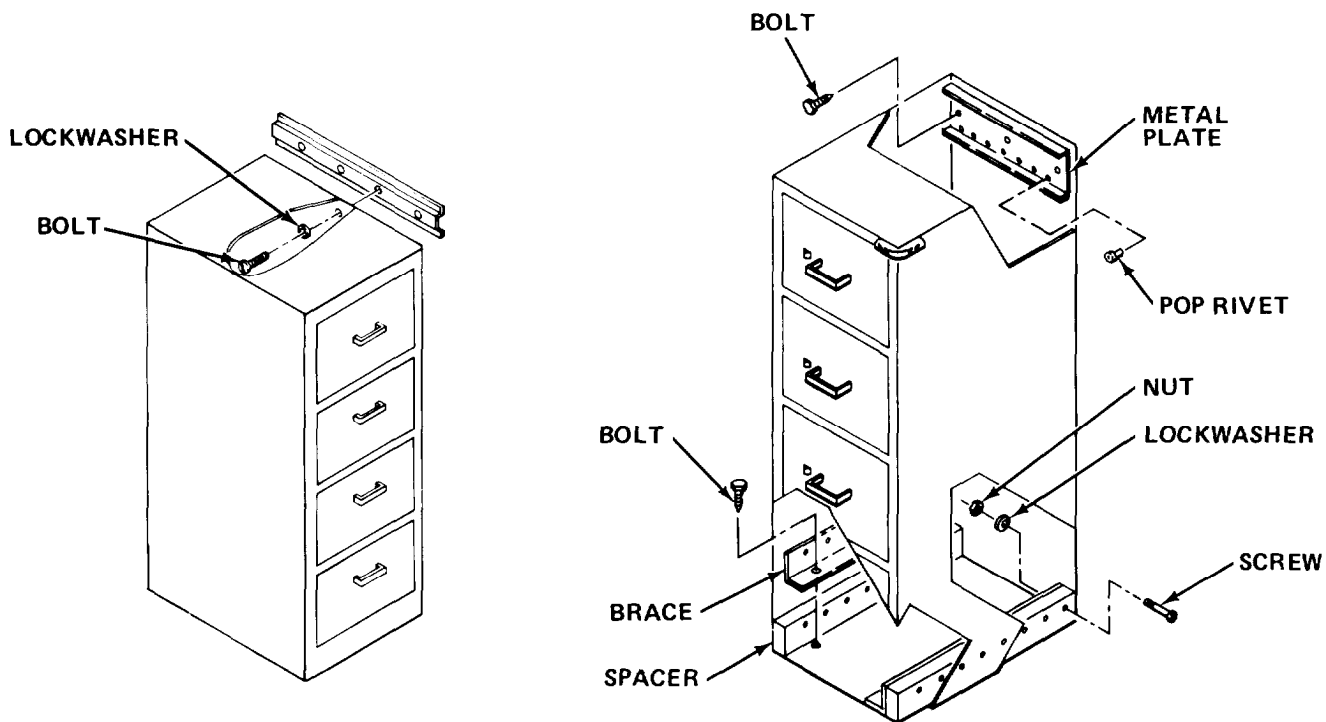
7-16.6 Remove/Install Filing Cabinet.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver  
 1/2 in. Socket, 1/2 in. Drive  
 1/2 in. Drive Ratchet

SUPPLIES: Filing Cabinet

- a. Remove drawers from cabinet.



**NOTE**

Mounting of cabinets vary from section to section.

- b. Remove upper mounting bolts and lockwashers.
- c. Remove lower mounting bolt, lockwasher, and brace.
- d. Remove filing cabinet.
- e. Reinstall drawers.
- f. Remove drawers from new cabinet.
- g. Line up new cabinet inside section over mounting holes.

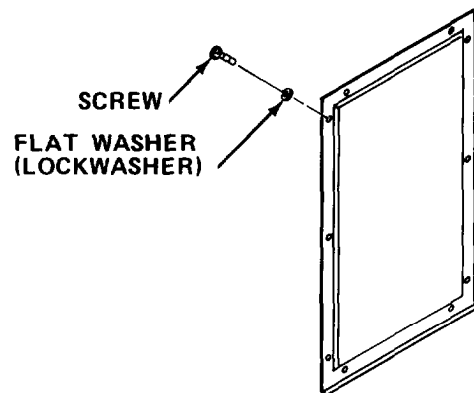
- h. Secure cabinet with upper bolts and lockwashers, and lower brace, bolts, and lockwashers.
- i. Reinstall drawers.

7-16.7 Remove/Install Corkboard.

MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Cross Tip Screwdriver

SUPPLIES: Corkboard



- a. Remove attaching hardware securing defective corkboard to wall.
- b. Remove defective corkboard.
- c. Position new corkboard and align mounting holes.
- d. Secure new corkboard to wall with attaching hardware.

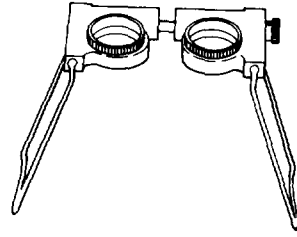
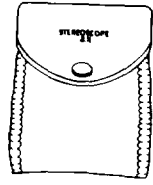
**7-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE**

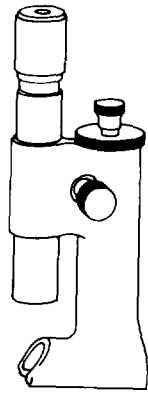
There are no direct/general support maintenance procedures assigned for this equipment.



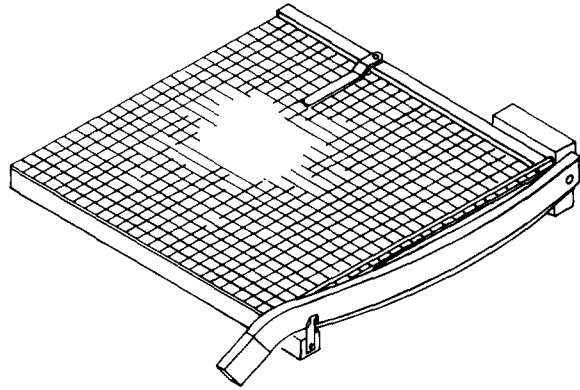




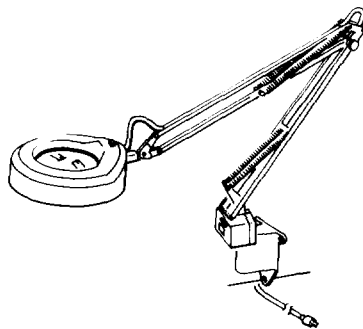
**POCKET STEREOSCOPE**



**OPTICAL  
MACROSCOPE**



**PAPER TRIMMER**



**MAGNIFIER LAMP**

**CHAPTER 8****SUPPORT ITEMS****Section I INTRODUCTION****8-1. GENERAL INFORMATION.**

8-1.1 Scope. This chapter covers the support items contained in this chapter. The support items consist of the following equipment:

- a. Model LFM1BX5 Magnifier Lamp.
- b. Model FED-99-T-678 Paper Trimmer.
- c. Type 1 Pocket 2X Stereoscope.
- d. Model 31-29-33-35 Optical Microscope.

**8-2. EQUIPMENT DESCRIPTION.**

8-2.1 Equipment Characteristics, Capabilities, and Features.

- a. Magnifier Lamp. Adjustable for accurate positioning to provide illuminated magnification of precision work. Provision for both wall and bench mounting.
- b. Paper Trimmer. Cuts paper up to 24 in. wide.
- c. Pocket Stereoscope. Optically matches and gives operator an apparent single image of two maps or photographs.
- d. Optical Microscope. Provides wide field low power, for use in making observations which require working distances and magnifications beyond the range of conventional magnifiers. Provides image which is right side up and not reversed.

8-2.2 Equipment Data.

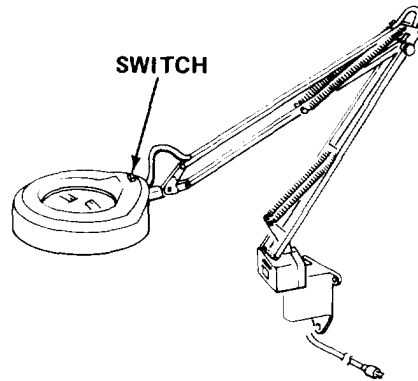
- a. Magnifier lamp. Replaceable 115 V ac lamp and diffuser.
- b. Optical Microscope. Received completely assembled with storage case. Two C-cell batteries are included.

**8-3. TECHNICAL PRINCIPLES OF OPERATION.** Principles of operation are combined with operator's controls and indicators.

Section II OPERATING INSTRUCTIONS

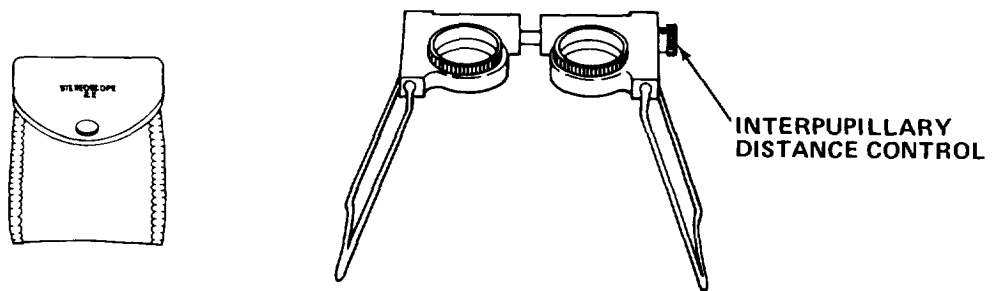
8-4. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS.

8-4.1 Magnifier Lamp.



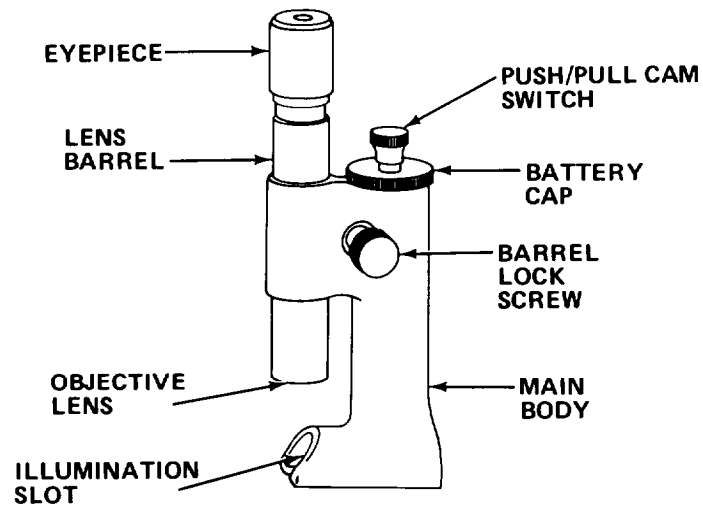
Control or Indicator	Function
Switch	Turns lamp on/off.

8-4.2 Pocket Stereoscope.



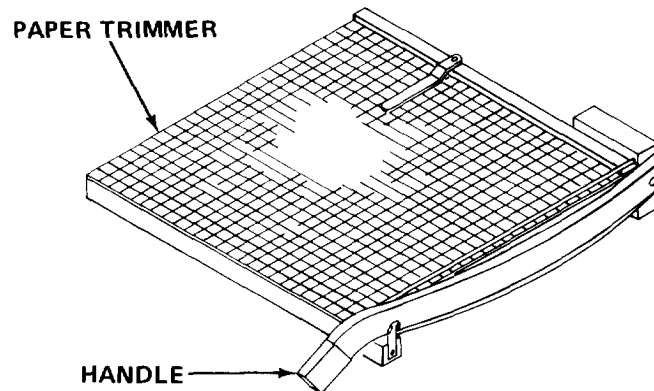
Control or Indicator	Function
Interupillary Distance Control	Adjusts interupillary distance of lenses to match that of viewer.

8-4.3 Optical Macroscope.



Control or Indicator	Function
Push-Pull Cam Switch	Switches light on and off.
Battery Cap	Removable cap allows two C-cell batteries to be replaced.
Barrel Lock Screw	Locks lens barrel in position when tightened.
Main Body	Battery housing, lens barrel holder, and optical microscope stand.
Illumination Slot	Light from 2.5 V bulb is directed through this slot.
Objective Lens	Fixed lens part of magnifying optics.
Lens Barrel	Provides focusing movement for objective and eyepiece lens assembly.
Eyepiece	Removable eyepiece for observing image.

8-4.4 Paper Trimmer.



Control or Indicator	Function
Handle	Operates cutter.

**8-5. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES.**

- a. Before You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your before (B) PMCS.
- b. While You Operate. Always keep in mind the WARNINGS and CAUTIONS. Perform your during (D) PMCS.
- c. After You Operate. Be sure to perform your after (A) PMCS.
- d. If Your Equipment Fails To Operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms. See DA pam 738-750.

8-5.1 PMCS Procedures.

- a. PMCS are designed to keep the equipment in good working condition by performing periodic service tasks.
- b. Service intervals provide you, the operator, with time schedules that determine when to perform specified service tasks.
- c. The “Equipment is Not Ready/Available If” column is used for identification of conditions that make the equipment not ready/available for readiness reporting purposes or denies use of the equipment until corrective maintenance is performed.

d. If your equipment fails to operate after PMCS is performed, immediately report this condition to your supervisor.

e. Perform weekly as well as before operation if you are the assigned operator and have not operated the item since the last weekly or if you are operating the item for the first time.

f. Item number column. Item numbers are assigned in chronological ascending sequence regardless of interval designation. These numbers are used for your "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet in recording results of PMCS.

g. Interval columns. This column determines the time period designated to perform your PMCS.

h. Item to be inspected and procedures column. This column lists functional groups and their respective assemblies and subassemblies as shown in the Maintenance Allocation Chart (Appendix B). The appropriate check or service procedure follows the specific item to be inspected.

i. Equipment is not ready/available if: column. This column indicates the reason or cause why your equipment is not ready/available to perform its primary mission.

j. List of tools and materials required for PMCS

<u>Equipment</u>	<u>Items</u>	<u>Quantity</u>
Magnifier Lamp	Liquid Lens Cleaner (Item 4, Appendix E)	ar
	Cheesecloth (Item 5, Appendix E)	ar
Pocket Stereoscope	Lens Tissue (Item 24, Appendix E)	ar
Optical Microscope	Lens Brush	1 ea
	Cheesecloth (Item 5, Appendix E)	ar
	Lens Tissue (Item 24, Appendix E)	ar
	Liquid Lens Cleaner (Item 4, Appendix E)	ar

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
<b><u>SUPPORT ITEMS</u></b>			
1	B	<u>Inspect Magnifier Lamp.</u>  1. Inspect lens for cracks, breaks, or dirt. Clean as required.  2. Inspect arms and bracket for cracks or breaks. Replace as required.	Lens cracked or broken.  Arms or base cracked or broken.
2	B	<u>Service Magnifier Lamp.</u>  1. Turn off magnifier lamp.  2. Apply small amount of liquid lens cleaner on lens and wipe clean with cheesecloth.  3. Turn on magnifier lamp.	
3	B	<u>Clean Pocket Stereoscope.</u>  1. Inspect lenses for dust, dirt, cracks, or breaks.  2. Clean lenses with lens tissue.  3. Inspect housing and legs for cracks and breaks.	



Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

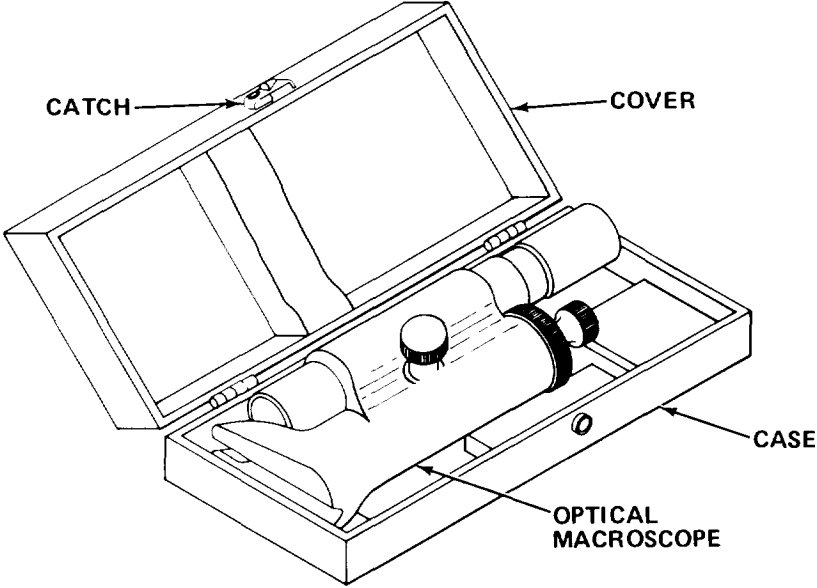
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment is Not Ready/ Available If:
4	B	<p><u>SUPPORT ITEMS - Cont</u></p> <p><u>Inspect Optical Microscope.</u></p>  <ol style="list-style-type: none"> <li>1. Inspect exterior of carrying case for scratches or dents.</li> <li>2. Release catch and open cover.</li> </ol> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <ul style="list-style-type: none"> <li>● Always place optical microscope on level and stable surface when not in use.</li> <li>● Do not touch lens surfaces with bare hands. Fingerprints can damage lens surfaces. Clean lenses immediately if touched.</li> </ul> <ol style="list-style-type: none"> <li>3. Remove optical microscope from case.</li> </ol>	

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
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(Number ) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
<u>SUPPORT ITEMS - Cont</u>			
4	B	<p><u>Inspect Optical Microscope.</u></p> <div style="text-align: center;"> <p>The diagram shows a side view of an optical microscope. Labels with arrows point to the following parts: 'LENS SURFACE' at the top of the lens barrel, 'LENS BARREL' along the upper section, 'MOVABLE CONTROLS' for the eyepiece and objective lenses, 'BODY' for the main housing, and another 'LENS SURFACE' at the bottom of the lens barrel.</p> </div> <ol style="list-style-type: none"> <li>4. Inspect optical microscope for broken, damaged, or missing parts.</li> <li>5. Inspect lens surfaces for cleanliness.</li> <li>6. Inspect movable controls for security.</li> <li>7. Inspect main body and lens barrel for scratches or dents.</li> </ol>	

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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D - During  
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W - Weekly  
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(Number) - Hundreds of Hours

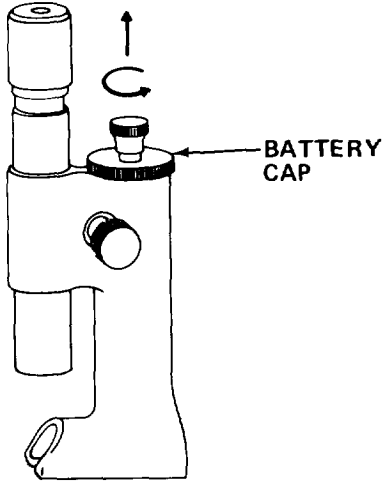
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
4	B	<p><b><u>SUPPORT ITEMS - Cont</u></b></p> <p><u>Inspect Optical Microscope - cont</u></p> <p style="text-align: center;"><b><u>WARNING</u></b></p> <p>Do not allow battery acid to come in contact with your eyes or skin. In event of contamination, flush affected area with large quantities of fresh water and call for medical assistance.</p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Leaking or damaged batteries can discharge corrosive and mildly toxic substance which can damage equipment.</p> <div style="text-align: center;">  <p>The diagram shows a side view of an optical microscope. A small cylindrical cap is being unscrewed from the top of the microscope's body. An arrow points to the cap with the label 'BATTERY CAP'. A circular arrow above the cap indicates it should be turned counter-clockwise to be removed.</p> </div> <p>8. Unscrew and remove battery cap.</p> <p>9. Place one hand in position to catch batteries, and turn optical microscope upside down to remove batteries.</p>	

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

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W - Weekly  
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AN - Annually  
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(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
<b>SUPPORT ITEMS - Cont</b>			
4	B	<p><u>Inspect Optical Microscope.</u></p> <p>10. Examine batteries for damage or signs of leakage,</p> <p>11. Inspect inside of battery housing for damage or corrosion.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Observe correct polarity when replacing batteries.</p> <p>12. Replace batteries.</p> <p>13. Replace battery cap.</p>	
5	B	<p><u>Service Optical Microscope</u></p> <div style="text-align: center;"> </div> <p>1. Release catch and open cover.</p>	

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
D - During  
A - After

W - Weekly  
M - Monthly  
Q - Quarterly

AN - Annually  
S - Semiannually  
BI - Biennially

(Number) - Hundreds of Hours

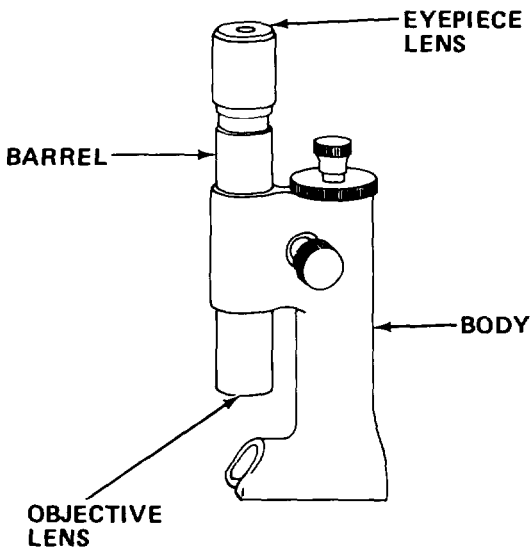
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
5	B	<p><b>SUPPORT ITEMS - Cont</b></p> <p><u>Service Optical Microscope - Cont</u></p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <ul style="list-style-type: none"> <li>● Always place optical microscope in case when not in use.</li> <li>● Do not touch lens surfaces with bare hands. Fingermarks can damage lens surfaces. Clean lens immediately if touched.</li> <li>● Use only approved lens cleaner and materials for cleaning lenses.</li> </ul> <p>2. Remove optical microscope from case.</p> <div style="text-align: center;">  <p>The diagram shows a side view of an optical microscope. It has a vertical barrel at the top with an eyepiece lens. Below the barrel is the main body, which has a circular objective lens on the front. A label 'EYEPIECE LENS' points to the top lens, 'BARREL' points to the upper section, 'BODY' points to the main housing, and 'OBJECTIVE LENS' points to the front lens.</p> </div>	

Table 8-1. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES - Cont

B - Before  
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(Number) - Hundreds of Hours

ITEM NO.	INTERVAL	ITEM TO BE INSPECTED  PROCEDURE	For Readiness Reporting, Equipment Is Not Ready/ Available If:
5	B	<p><b><u>SUPPORT ITEMS - Cont</u></b></p> <p><u>Service Optical Microscope - Cont</u></p> <p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Use only a mild detergent for cleaning body. Strong solvents will damage parts.</p> <p>3. Using lens brush, remove any dust and dirt from objective lens and eyepiece lens.</p> <p>4. Remove any remaining dirt using lens tissue and liquid lens cleaner.</p>	

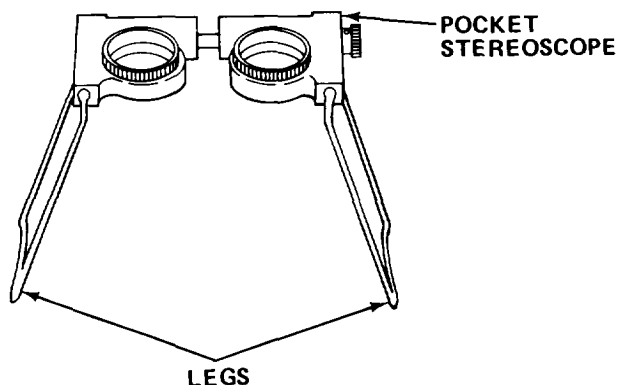
**8-6. OPERATION UNDER USUAL CONDITIONS.**

8-6.1 Magnifier Lamp.

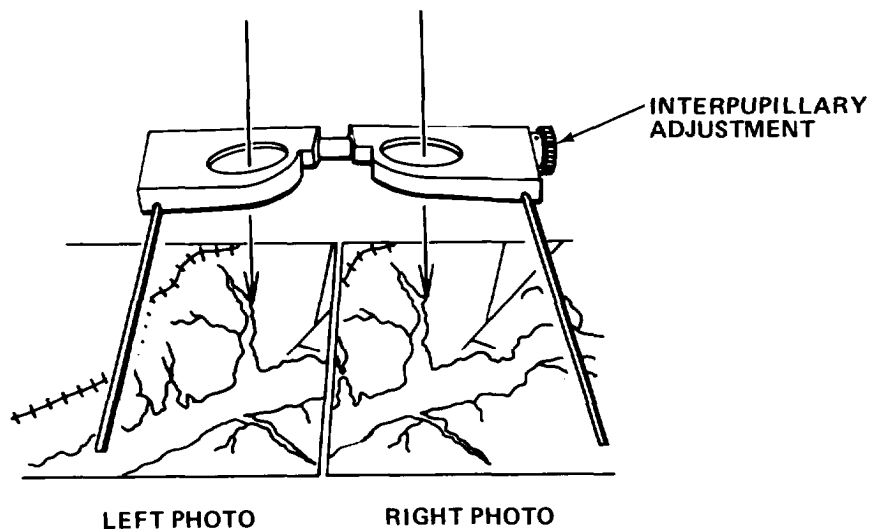
- a. Move magnifier lamp from mounting bracket and position over object to be examined.
- b. Plug in power cord.
- c. Turn on fluorescent lamp.
- d. Examine object through lens.

8-6.2 Pocket Stereoscope.

- a. Position photography for viewing in stereo.



- b. Remove pocket stereoscope from case and unfold legs.



- c. Set pocket stereoscope on photos so that left lens is over left photograph and right lens is over right photograph.

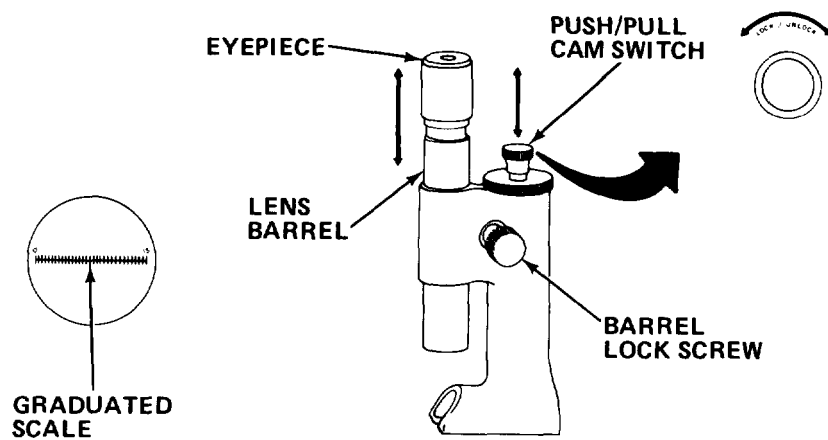
- d. Adjust interpupillary distance between lenses until it matches that of viewer.

- e. Locate detail to be viewed on left photograph and center left lens over it.

- f. Move right photograph until the same detail is centered under right lens. When viewed simultaneously, two details should merge into one. Adjust photographs until this effect is achieved.

8-6.3 Optical Macroscope.

a. Place optical macroscope over area to be viewed with illumination slot close to specific area required.



b. Loosen barrel lock screw.

c. Look through eyepiece and depress push/pull cam switch.

d. Grasp lens barrel and move it slowly up and down until area to be viewed is seen clearly and sharply together with graduated scale.

e. When target and graduated scale appear simultaneously sharp and clear, clamp barrel lock screw.

f. To provide light without keeping push/pull cam switch depressed, turn push/pull cam switch in either direction through 90 degrees to lock it. Rotation in opposite direction will unlock it.

g. To make measurement, read size of object or target directly from scale. Scale is 0.150 in. in length and is divided into intervals of 0.001 in. With care, estimations of down to 0.0005 in. are possible.

**8-7. OPERATION UNDER UNUSUAL CONDITIONS.** This equipment is designed for operation only in a controlled environment.



**Section III OPERATOR MAINTENANCE**

**8-8. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

**8-9. TROUBLESHOOTING PROCEDURES.**

a. The table lists the common malfunctions which you may find during the operator maintenance of the support equipment. You should perform the test/inspection and corrective actions in the order listed.

b. This manual cannot list all the possible malfunctions or every possible test/inspection and corrective action. If a malfunction is not listed or is not corrected by a listed corrective action, notify your supervisor.

**Table 8-2. TROUBLESHOOTING**

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. MAGNIFIER LAMP WILL NOT LIGHT.	Check that magnifier lamp is plugged into active power outlet. Press switch OFF, then ON.	(a) If lamp still does not come on, replace lamp. (b) If new lamp does not light, refer to organizational maintenance.

**8-10. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering operator maintenance functions for the support items. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Lamp in Magnifier Lamp Assembly . . . . .	8-10.1

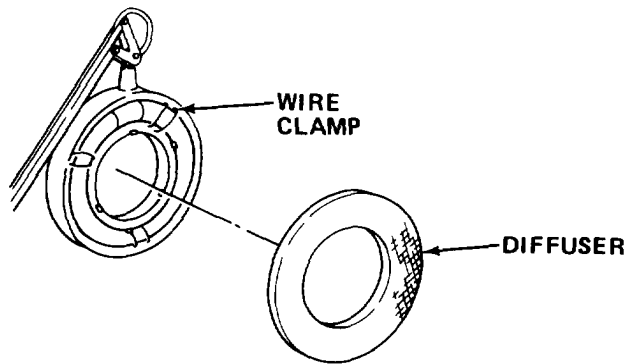
8-10.1 Replace Lamp in Magnifier Lamp Assembly.

MOS: 81C, Cartographer

SUPPLIES: Fluorescent Lamp (22 W)

**WARNING**

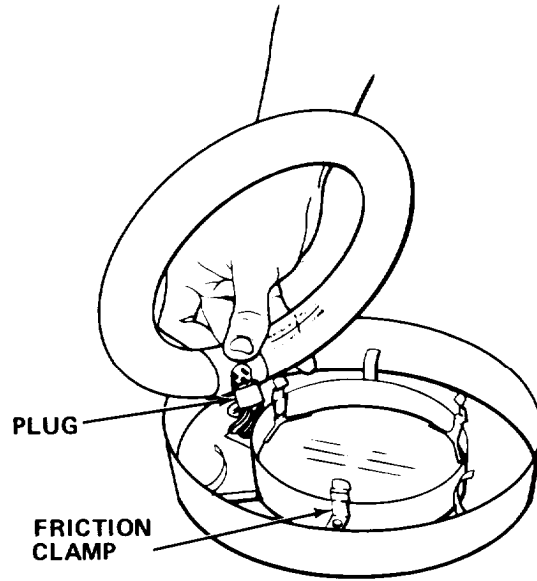
Death or serious injury may occur from electrical shock unless power cord is unplugged before servicing.



- a. Unplug magnifier lamp and remove diffuser.

**NOTE**

On some magnifier lamp models, lamp is held in place with friction clamps.



- b. Release wire clamps, pull out lamp, and disconnect plug from lamp.
- c. Connect plug to new lamp and retain lamp with wire clamps.
- d. Reinstall diffuser.

#### Section IV ORGANIZATIONAL MAINTENANCE

**8-11. LUBRICATION INSTRUCTIONS.** This equipment does not require lubrication.

#### **8-12. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT.**

8-12.1 Common Tools and Equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

8-12.2 Special Tools; Test, Measurement, and Diagnostic Equipment and Support Equipment. Special Tools, TMDE, and Support Equipment is listed in the applicable repair parts and special tools list and in Appendix B of this manual.

8-12.3 Repair Parts. Repair parts are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6675-321-24P covering organizational maintenance for this equipment.

**8-13. SERVICE UPON RECEIPT.**

**8-13.1 Checking Unpacked Equipment.**

a. Inspect the equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packing Improvement Report.

b. Check the equipment against the packing list to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether the equipment has been modified.

**8-14. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.** There are no organizational PMCS procedures assigned for this equipment.

**8-15. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES.** If the magnifier lamp does not power up when turned on, verify that 120 V ac is present at the receptacle. If voltage is not present, plug equipment into receptacle with power available and proceed with equipment troubleshooting. Perform no-power procedure for dead receptacle (Table 1-4). If voltage is present, replace magnifier lamp assembly (paragraph 8-16.1).

**8-16. MAINTENANCE PROCEDURES.**

a. This section contains instructions covering organizational maintenance functions for the support items. Personnel required are listed only if the task requires more than one.

b. After completing each maintenance procedure, perform operational check to be sure that equipment is properly functioning.

INDEX

PROCEDURE	PARAGRAPH
Replace Magnifier Lamp Assembly . . . . .	8-16.1

**8-16.1 Replace Magnifier Lamp Assembly.**

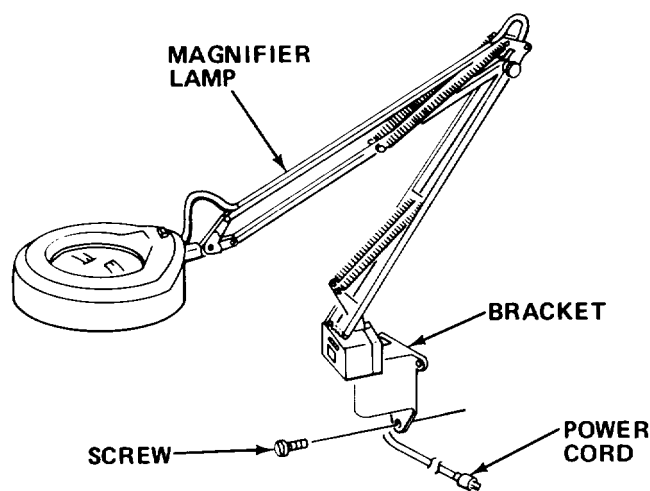
MOS: 83FJ6, Reproduction Equipment Repairer

TOOLS: Flat Tip Screwdriver

SUPPLIES: Magnifier Lamp Assembly

**WARNING**

Death or serious injury may occur from electrical shock if power cord is not unplugged before servicing.



- a. Unplug power cord and remove magnifier lamp assembly from bracket.
- b. Remove screws and bracket from wall.
- c. Reinstall bracket and secure with screws.
- d. Install new magnifier lamp assembly on bracket and plug in power cord.

**8-17. PREPARATION FOR STORAGE OR SHIPMENT.** Contact your battalion for packing and shipping instructions.

**Section V DIRECT/GENERAL SUPPORT MAINTENANCE**

There are no direct/general support maintenance procedures assigned for this equipment.



**APPENDIX A**  
**REFERENCES**

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**A-1. SCOPE.**

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

**A-2. FORMS.**

Recommended Changes to Publications and Blank Forms . . . . .	DA Form 2028
Recommended Changes to Equipment Technical Publications . . . . .	DA Form 2028-2
HandReceipt/ Annex Number. . . . .	DA Form 2062
Equipment Inspection and Maintenance Worksheet . . . . .	DA Form 2404
The Army Maintenance Management System (TAMMS). . . . .	DA Pam 738-750
Quality Deficiency Report . . . . .	SF 368

**A-3. FIELD MANUALS.**

Camouflage. . . . .	FM5-20
Nuclear, Biological and Chemical (NBC) Defense (Reprinted w/Basic Incl C1) . . . . .	FM21-40
Basic Cold Weather Manual . . . . .	FM31-70
Northern Operations . . . . .	FM31-71
Metal Body Repair and Related Operations . . . . .	FM43-2

**A-4. TECHNICAL MANUALS.**

Administrative Storage of Equipment . . . . .	TM 740-90-1
Chemical, Biological and Radiological (CBR) Decontamination . . . . .	TM 3-220
Operator, Organizational, Direct Support and General Support Maintenance Manual: Air Conditioner, Horizontal, Compact, 208-Volt, 3-Phase, 18,000 Btu Cooling, 12,000 Btu Heating. . . . .	TM 5-4120-367-14

**TM 5-6675-321-14**

- Operator, Organizational, Direct Support and  
General Support Maintenance Manual for Chassis,  
Semi-Trailer, Container Transporter (ADCOR) . . . . . TM 5-2330-305-14
  
- Organizational, Direct Support and General Support  
Maintenance Repair Parts and Special Tools List  
(Including Depot Maintenance Repair Parts and  
Special Tools) for Air Conditioner/Heater . . . . . TM 5-4120-367-24P
  
- Organizational, Direct Support and General Support  
Maintenance Repair Parts and Special Tools List  
(Including Depot Maintenance Repair Parts and  
Special Tools) for Chassis, Semi-Trailer,  
Container Transporter (ADCOR) . . . . . TM 5-2330-305-24P
  
- Organizational, Direct Support and General Support  
Maintenance Repair Parts and Special Tools List  
(RPSTL) (Including Depot Maintenance Repair Parts  
and Special Tools) for Mosaicking/Drafting Section. . . . . TM 5-6675-321-24P
  
- Painting Instructions for Field Use . . . . . TM 43-0139
  
- Procedure for the Destruction of Equipment to  
Prevent Enemy Use . . . . . TM 750-244-3
  
- Use and Care of Hand Tools and Measuring Tools . . . . . TM 9-243

**A-5. MISCELLANEOUS PUBLICATIONS.**

- Lubrication Order: Topographic Support  
Mosaicking/ Drafting Section, Model ADC-TSS-10 . . . . . LO 5-6675-321-12



**APPENDIX B****MAINTENANCE ALLOCATION CHART****Section I INTRODUCTION****B-1. GENERAL.**

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

**B-2. MAINTENANCE FUNCTIONS.** Maintenance functions will be limited to and defined as follows:

a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. **Aline.** To adjust specified variable elements of an item to bring about optimum or desired performance.

f. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test, measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Remove/ Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. Repair. The application of maintenance services<sup>1</sup>, including fault location/troubleshooting<sup>2</sup>, removal/installation, and disassembly/assembly<sup>3</sup> procedures, and maintenance actions<sup>4</sup> to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item or system.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

### **B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.**

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies and modules with the next higher assembly. End item group number shall be "00."

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

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<sup>1</sup>Services - Inspect, test, service adjust, aline, calibrate and/or replace.

<sup>2</sup>Fault locate/troubleshoot - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

<sup>3</sup>Disassemble/assemble - Encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componenty identified as maintenance significant (i.e., assigned an SMR code) for the category of maintenance under consideration.

<sup>4</sup>Actions - Welding, grinding, riveting, straightening, facing, remachining and/or resurfacing.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operation conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart. The symbol designations for the various maintenance categories are as follows:

- C . . . . Operator or Crew
- O . . . . Organizational Maintenance
- F . . . . Direct Support Maintenance
- H . . . . General Support Maintenance
- L . . . . Specialized Repair Activity <sup>5</sup>
- D . . . . Depot Maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetical order, which shall be keyed to the remarks contained in Section IV.

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<sup>5</sup>This maintenance category is not included in Section II, column (4) of the Maintenance Allocation Chart. To identify functions to this category of maintenance, enter a work time figure in the "H" column of Section II, column (4), and use an associated reference code in the Remarks column (6). Key the code to Section IV, Remarks, and explain the SRA complete repair application there. The explanatory remark(s) shall reference the specific Repair Parts and Special Tools List (RPSTL) TM which contains additional SRA criteria and the authorized spare/repair parts.

**B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III**

a. Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

**B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.**

a. Column 1, Reference Code. The code recorded in Column 6, Section II.

b. Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

**Section II. MAINTENANCE ALLOCATION CHART**

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Cat.					(5) Tools and Eqpt	(6) Remarks
			C	O	F	H	D		
00	MOSAICKING/DRAFTING SECTION	Overhaul						**	
01	VAN BODY (ISO CONTAINER)	Inspect	0.8					14	
		Service	0.9	0.5				7,11,13	
		Repair		1.0	1.5	2.0		1,3,5,15	B
	FLUORESCENT LIGHT ASSY	Repair	0.1	0.7				1	
	BLACKOUT/DOME LIGHT ASSY	Repair	0.2						
	EXHAUST FAN ASSEMBLY	Repair		0.5				1	
	AIR CONDITIONER/ HEATER ASSY	Replace				2.0	1		A A
	ELECTRICAL ASSEMBLY	Inspect		0.5					
		Repair		0.9	1.0			1,3	
	TELEPHONE BINDING POST ASSY	Repair		0.7				5	
	EMERGENCY LIGHT ASSY	Replace		0.3				5	
	TIEDOWN SOCKET ASSY	Replace		0.3				5	
	LEVEL INDICATOR ASSY	Repair		0.6				2,3	
	BLACKOUT CURTAIN ASSY	Repair		1.0				5	

\*\* Depot will determine work time.

Section II. MAINTENANCE ALLOCATION CHART - Cont

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Cat.					(5) Tools and Eqpt	(6) Remarks
			C	O	F	H	D		
01	VAN BODY - Cont (ISO Container)								
	PERSONNEL LADDER ASSY	Repair		0.8				5.15	B
	PERSONNEL/CARGO DOOR ASSY	Replace Repair			1.5 2.0			5 5	
02	DRAFTING, SCRIBING TRACING TABLE	Inspect Service Remove/ Install	0.2 0.4					12	
	ELECTRICAL SYSTEM	Repair	0.2	0.6				1	
	TABLE TOP TILT LOCKING ASSEMBLY	Repair		0.7				1	
	PILLOW BLOCK ASSEMBLY	Replace		0.5				1	
03	PORTABLE FILM VIEWER	Inspect Service Repair	0.17 0.17						
				0.33				1	
04	ADHESIVE WAX COATER	Inspect Service Adjust	0.25 0.50 0.33		0.33			8,9,10,13	
		Repair			2.50			4,16,17	B
05	ULTRASONIC CLEANER	Inspect Repair	0.2					1	
	CIRCUIT BOARD	Replace		0.6				1	
06	POCKET CALCULATOR	Inspect Repair	0.3 0.2						

Section II. MAINTENANCE ALLOCATION CHART - Cont


(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Cat.					(5) Tools and Eqpt	(6) Remarks
			C	O	F	H	D		
07	FURNITURE AND CABINETS	Inspect Remove/ Install Repair	0.5	0.9				1,15	
08	SUPPORT ITEMS	Inspect Service Remove/ Install	0.8 0.5	0.7 0.3				1,3 6 1	

Section III TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
1	O	Shop Kit, Automotive Maint and Repair Common #1 Plus Metric Option	4910-00-754-0654	
2	O	Tool Kit, Carpenters Eng Squad	5180-00-293-2875	
3	O	Tool Kit, General Mechanic's Equipment	5180-00-177-7033	
4	F,H	Tool Kit, Electronic Equipment	5180-00-610-8177	
5	O,F,H	Tool Kit, Light Machine Repair	5180-00-596-1540	
6	C	Brush, Dusting Lens	7920-00-205-0565	
7	C	Brush, Wire	7920-00-291-5815	
8	C	Gage, Thickness	5210-00-619-7680	
9	C	Scraper, Rubber	7330-00-680-2636	
10	C	Screwdriver, Cross-tip No. 2	5120-00-234-8913	
11	C	Wrench, Adjustable	5120-00-264-3795	
12	C	Grease Gun	4930-00-965-0288	
13	C	Screwdriver, Flat Tip 6 in.	5120-00-234-8910	
14	O	Spring Scale	6670-00-238-9777	
15	O,F,H	Rivet Gun	5120-00-017-2849	
16	F	Heat Gun		FSCM 59164 3260K51
17	F	Thermometer, Dial 6 in. Stem, 50 to 300		FSCM 39428 3988K56



**Section IV REMARKS**

Reference Code	Remarks
A	See TM 5-4120-367-14 for maintenance procedures.
B	Maintenance personnel and TSS section 7, maintenance van (which carries the required tools) are authorized by HHC TOE 05336 H600. 



## APPENDIX C

## COMPONENTS OF END ITEMS AND BASIC ISSUE ITEMS LISTS

## Section I INTRODUCTION

**C-1. SCOPE.**

This appendix lists components of end item and basic issue items for the Mosaicking/Drafting Section to help you inventory items required for safe and efficient operation.

**C-2. GENERAL.**

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

*a. Section II; Components of End Item.* This listing is for informational purposes only, and is not authority to requisition replacements. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

*b. Section III Basic Issue Items.* These are the minimum essential items required to place the Mosaicking/Drafting Section in operation, to operate it, and to perform emergency repairs. Bll must be with the Mosaicking/Drafting Section during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request the requisition replacement Bll based on TOE/EMTOE authorization of the end item.

**C-3. EXPLANATION OF COLUMNS.**

The following provides an explanation of columns found in the tubular listings:

*a. Column (1): Illustration Number (Illus Number).* This column indicates the number of the illustration in which the item is shown.

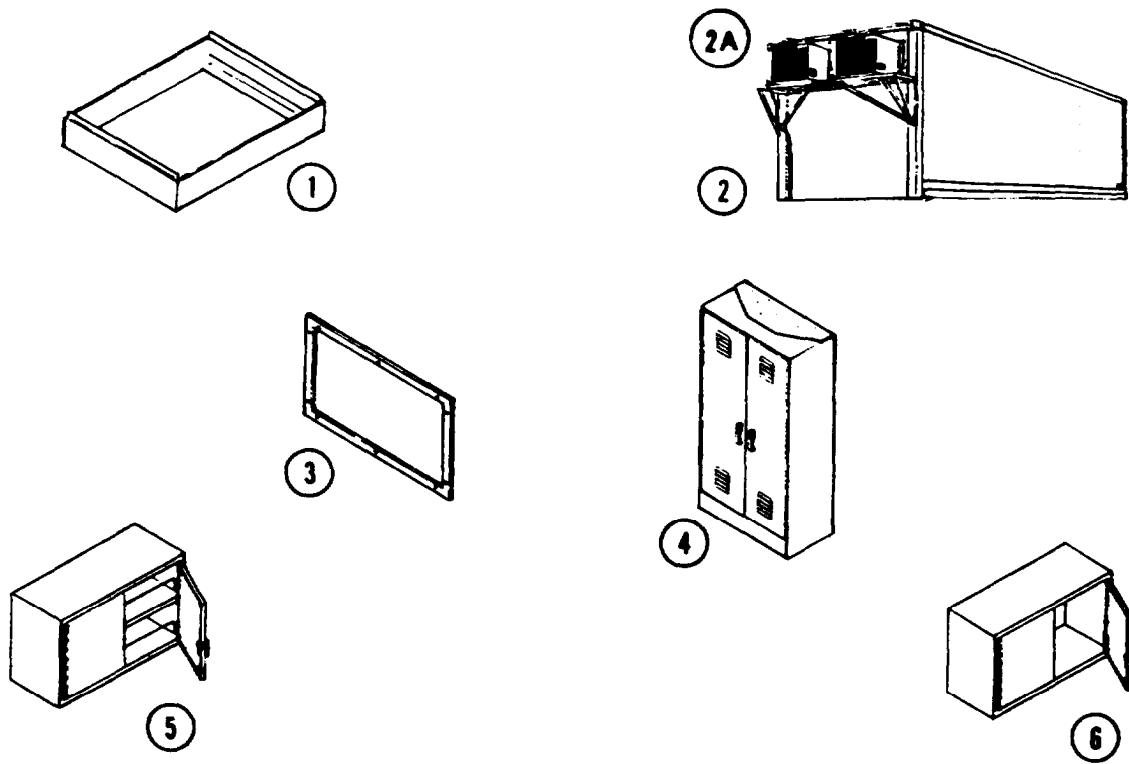
*b. Column (2): National Stock Number.* Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

*c. Column (3): Description.* Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

*d. Column (4): Unit of Measure (U/M).* Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

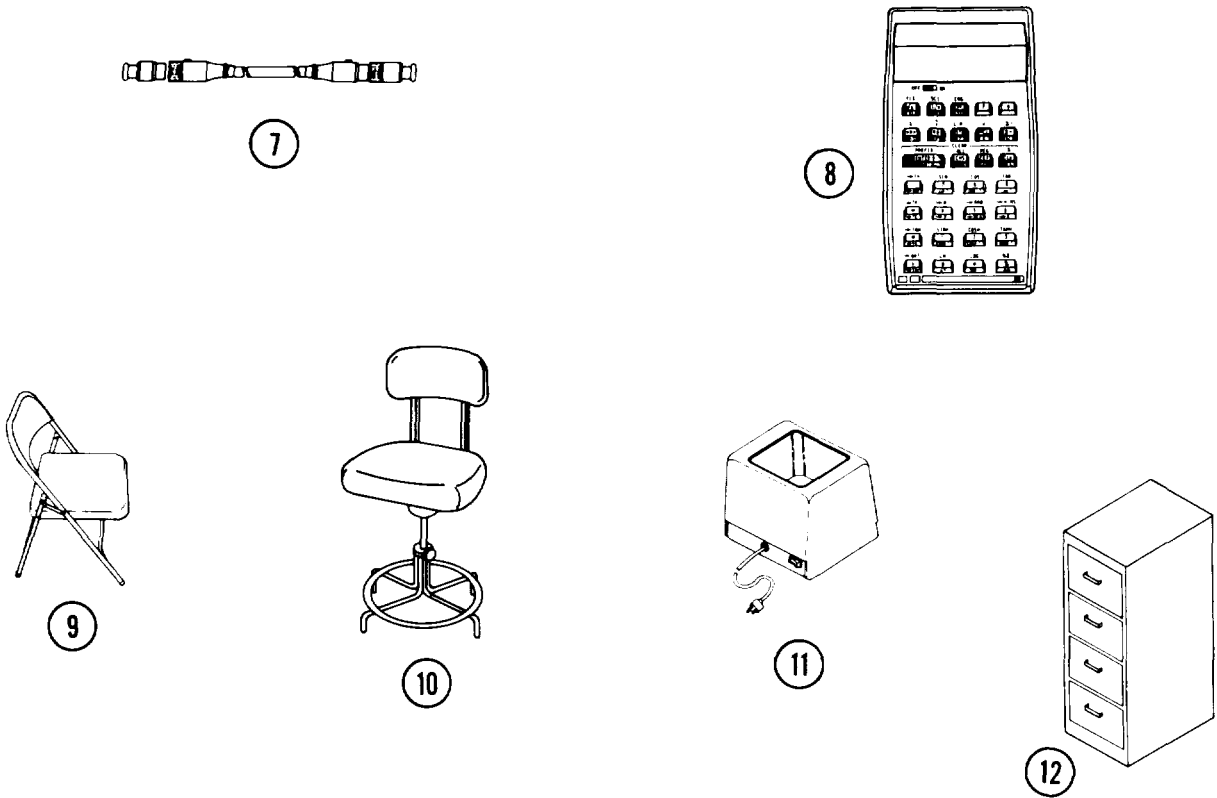
*e. Column (5): Quantity Required (Qty Rqr).* Indicates the quantity of the item authorized to be used with/on the equipment.

Section II COMPONENTS OF END ITEM



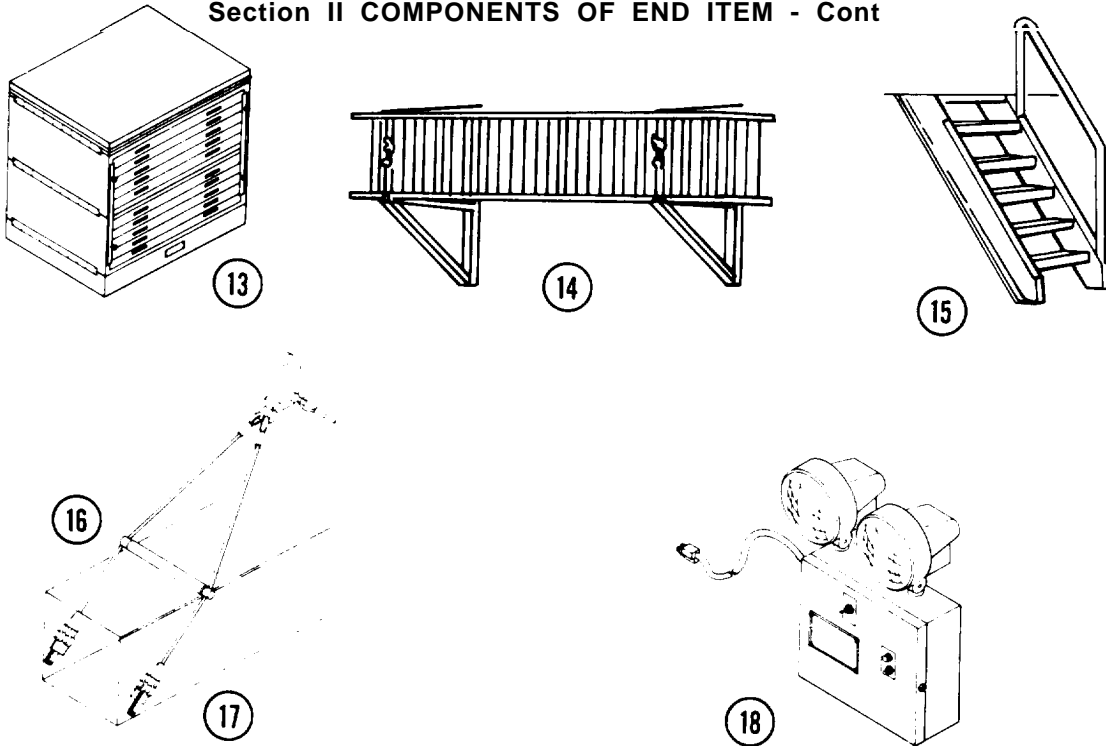
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
1		BASE, FILING CABINET: (88915) S4634	ea	1
2	6675-01-221-6009	VAN ASSEMBLY; MODIFIED: (97403) 13225E3035	ea	1
2A	4120-00-974-7206	AIR CONDITIONER (81349) MIL-A-52767	ea	2
3	7195-00-105-7941	BULLETIN BOARD, CORK: (79819) T5-2303	ea	1
4		CABINET, STORAGE, SUPPLY: (97403) 13225E3792	ea	2
5	7125-00-286-5259	CABINET, STORAGE, WALL: (97403) 13225E3150	ea	7
6		CABINET, STORAGE, TECH MANUALS: (97403) 13225E4648	ea	1

Section II COMPONENTS OF END ITEM - Cont



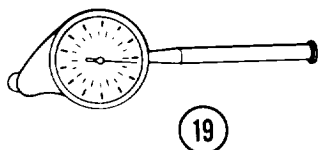
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
7	6150-00-134-0847	CABLE ASSEMBLY, POWER ELECTRICAL: (90129) RC1736-5, except 50.5 ft lg	ea	2
8	7420-01-139-7441	CALCULATING MACHINE: (51174) HP-32E	ea	1
9	7105-00-269-8463	CHAIR, FOLDING: (04718) 42-699/9DL	ea	2
10	7110-00-273-8791	CHAIR, ROTARY: (9D146) S-17	ea	4
11	4940-00-195-7251	CLEANER, ULTRASONIC: (79819) 3069 USC 3	ea	1
12	7110-00-267-2784	FILING CABINET: (37296) 30-3410-1	ea	5

Section II COMPONENTS OF END ITEM - Cont

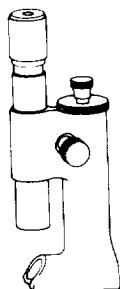


(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
13		FILING CABINET, MAP AND PLAN: (8891 5) F3445	ea	2
14		LADDER, EXTENSION-FOLDING: (39428) 8028T16	ea	1
15		LADDER, VEHICLE BOARDING: (51 745) 13225E3074	ea	2
16		LIFTING AND TIEDOWN DEVICE, TRANSPORTABLE SHELTER: Left hand (52555) 1390-4	ea	2
17		LIFTING AND TIEDOWN DEVICE, TRANSPORTABLE SHELFTER: Right hand (52555) 1390-3	ea	2
18		LIGHT, EMERGENCY: (97403) 13225E3396	ea	1

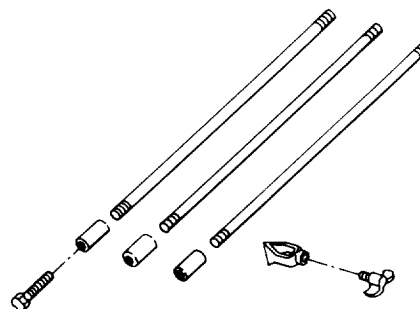
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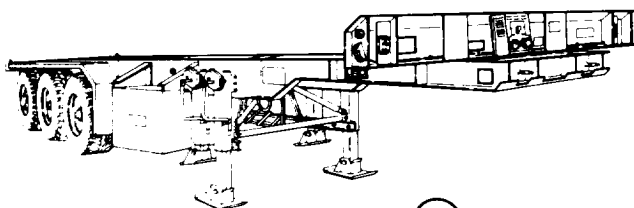
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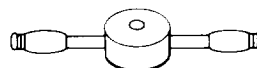
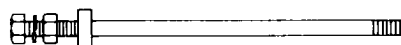
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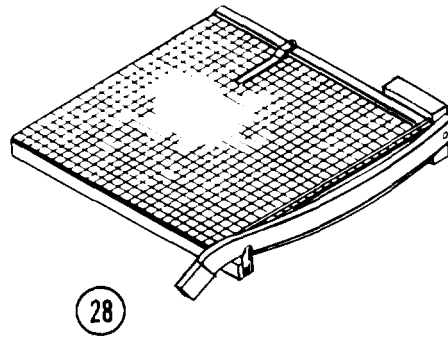
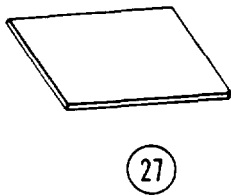
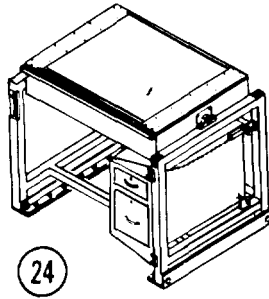
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23

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
19	6675-00-222-2542	MEASURER, MAP: (33363) 62-0300	ea	1
20	6650-00-299-9681	MACROSCOPE, OPTICAL: (06175) 31-29-33-34	ea	2
21	5975-00-878-3791	ROD, GROUND: (82370) A104	ea	1
22	2330-01-076-4797	SEMITRAILER, FLATBED: (97403) MERADCOM TL/MIL-B-13207, par. 3.11, Fig. 12, tables III and IV	ea	1
23	5120-01-013-1676	SLIDE HAMMER, GROUND ROD EMPLACEMENT: (45225) P74-144	ea	1

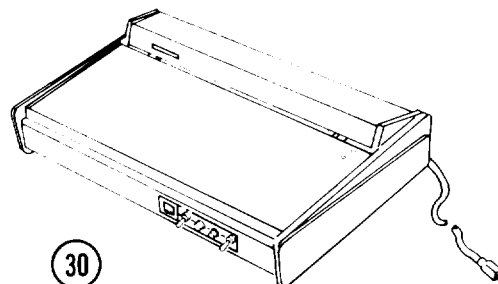
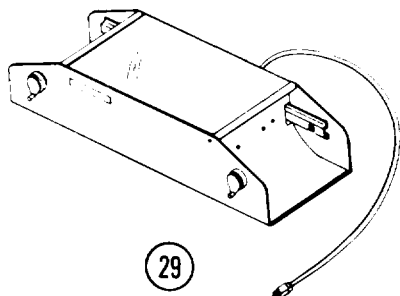
Section II COMPONENTS OF END ITEM - Cont



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
24	6675-01-203-1049	TABLE, SCRIBING, TRACING, DRAFTING: (33363) 99-9933	ea	4
25	Deleted			
26	Deleted			
27		TOP, FILING CABINET: (88915) T3445	ea	1
28	7520-00-224-7621	TRIMMER, PAPER, DROP KNIFE: (79819) 08-2-24	ea	1

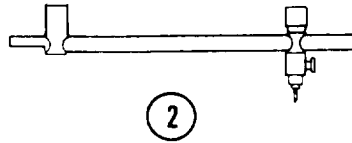


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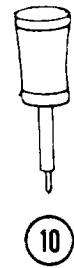
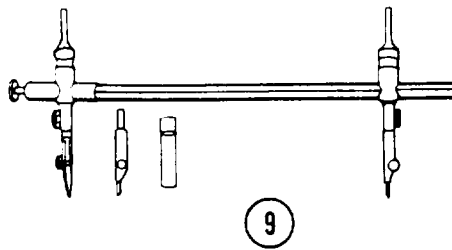
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
29	6675-01-033-7750	VIEWER, FILM, PORTABLE: (33363) 72-0210	ea	1
30	3540-01-045-9202	WAX COATER, ADHESIVE: (33887) 1215	ea	1

Section III BASIC ISSUE ITEMS



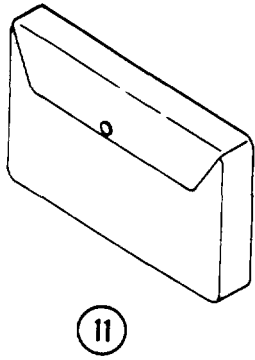
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
	8415-00-100-7742	APRON, LABORATORY: (85491) 1130	bx	2
1	6675-01-114-7226	BAR, EXTENSION BEAM, COMPASS: (33363) 55-1818	ea	1
2	6675-01-071-8913	BEAM ATTACHMENT, DRAFTING COMPASS: (79819) 31756	ea	2
	6530-00-772-0326	BOWL, SURGICAL SPONGE: (05668) 7272-00	ea	6
	8020-00-598-5907	BRUSH, ARTIST'S: Red sable (79819) 9355, size 6	ea	3
	8020-00-224-8027	BRUSH, ARTIST'S: Red sable (79819) 9355, size 8	ea	3
	8020-00-224-8022	BRUSH, ARTIST'S: Squirrel tail (79819) 9382, size 6	ea	3
	8020-00-262-9099	BRUSH, ARTIST'S: Squirrel tail (79819) 9382, size 8	ea	3
	8020-00-264-3883	BRUSH, ARTIST'S: Squirrel tail (79819) 9382, size 12	ea	3

Section III BASIC ISSUE ITEMS - Cont



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
	7920-00-291-5812	BRUSH, DUSTING, DRAFTSMAN'S: (79819) Q6-38NB-010	ea	6
	8020-00-260-1298	BRUSH, VARNISH: (39428) 7799T5	ea	6
	7920-00-291-5815	BRUSH, WIRE, SCRATCH: (39428) 7187T2	ea	1
	5640-00-849-9850	BUILDING BOARD, HARD PRESSED, VEGETABLE FIBER: (84287) LLL-B-810, type 1, finish A, design A, surface 2	sh	6
8	6675-00-459-8935	COMPASS, DRAFTING BEAM: Adjustable (79819) 3175	ea	1
9	6675-00-904-1947	COMPASS, DRAFTING BEAM: 24 in. (33363) 55-1806	ea	1
10	6675-01-071-8912	COMPASS, DRAFTING LEAD ATTACHMENT: (79819) 3175LA	ea	1
		CONTAINER ASSY, AERIAL FILM VIEWER 13225E3679	ea	1
		COVER, WORKING SURFACE, BOARD DRAFTING: (33363) P/N 99-9970	ea	6

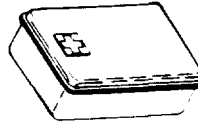
Section III BASIC ISSUE ITEMS - Cont



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12



13



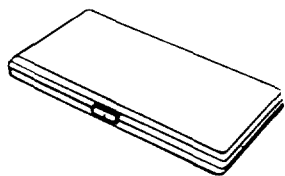
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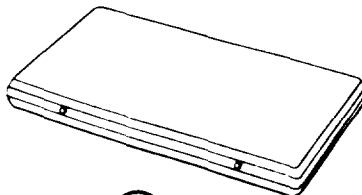
15

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
11	6675-00-244-0445	CURVE, DRAWING, IRREGULAR: (79819) 8255-F	ea	6
	6675-00-641-3512	DIVIDERS, DRAFHNG, PLAIN: (33363) 55-2910	ea	4
	6675-00-526-7323	DRAFTING EQUIPMENT SET; SUPPLEMENTARY: SC6675-90-CL-N06	se	4
	7490-00-770-7955	ERASER, ELECTRIC: (33363) 580571	ea	4
12	4210-00-555-8837	EXTINGUISHER, FIRE, MONOBROMOTRI- FLUOROMETHANE: (33525) T2	ea	2
13	6545-00-922-1200	FIRST AID KIT, GENERAL PURPOSE: (89875) SC C-6545-IL, Vol 2	ea	1
	5210-00-619-7680	GAGE, THICKNESS (80244) GGG-G-17 TYBCLISTA	ea	2
14	5110-00-595-8400	HOLDER, SANDING DISK: (39428) P/N 4731A2	ea	8
		KNIFE, CRAFTSMAN'S: (99941) 3001	ea	6
15	5110-00-595-8406	KNIFE, CRAFTSMAN'S: (79819) Q5-3041-2	ea	8
	7520-01-008-7640	LEAD REPOINTER, PENCIL: (79819) 992WB	ea	4

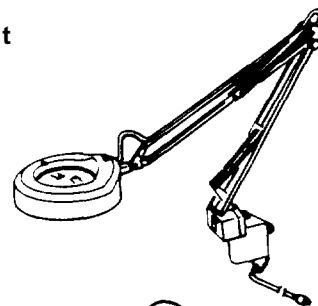
Section III BASIC ISSUE ITEMS - Cont



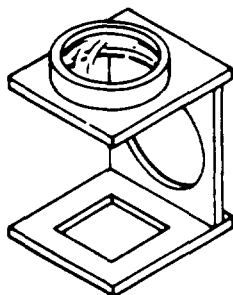
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18



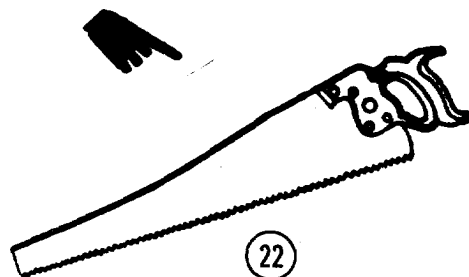
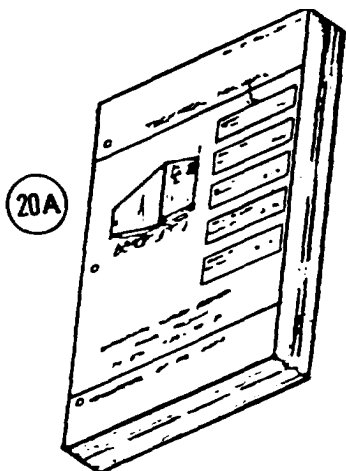
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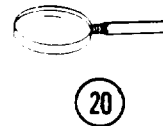
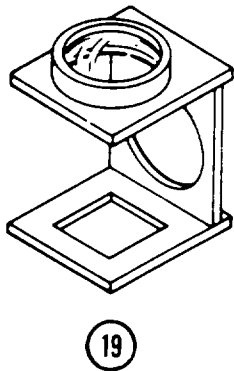
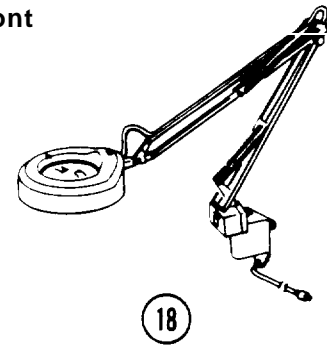
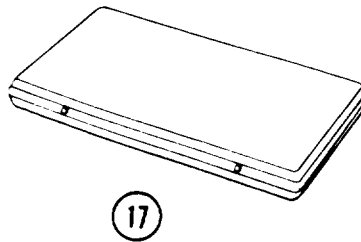
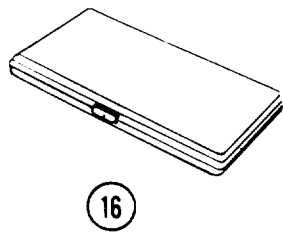
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) UIM	(5) Qty Rqr
	7520-00-295-6170	LEAD REPOINTER, PENCIL: (79819) 234	ea	6
16	6675-01-034-3110	LETTERING SET: rapidometric, (scribe, pens, ink) (79819) 3001JS9	se	1
17	6675-01-034-3109	LETTERING SET: (79819) 3036JS5	se	1
	6675-00-190-5854	LINE GUIDE, LETTERING, NONADJUSTABLE: (17866) 2030B6	ea	6
18	6650-00-477-9613	MAGNIFIER: monocular; lamp type (15607) KFM-1/B5D	ea	4
19	6650-00-255-8268	MAGNIFIER: monocular; linen tester (79819) Q8-9518	ea	6
20	6650-00-256-9060	MAGNIFIER: monocular; reading type (79819) Q8-9526	ea	1

Section III BASIC ISSUE ITEMS - Cont



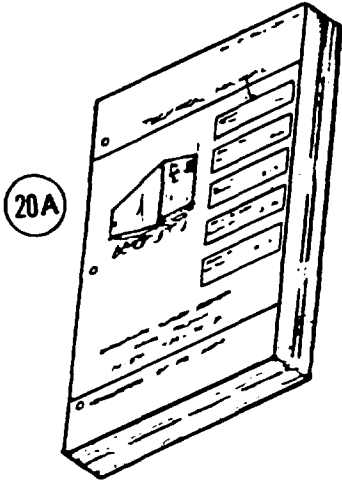
(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
20A	TM 5-6675-321-14	MANUALS, TECHNICAL OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT, TSS MOSAICKING/DRAFTING SECTION	ea	1
	LO 5-6675-321-12	LUBRICATION, ORDER, TSS MOSAICKING/ DRAFTING SECTION	ea	1
	TM 5-6675-321-24P	ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS; AND SPECIAL TOOLS LIST, TSS MOSAICKING/DRAFTING SECTION	ea	1
	TM 5-4120-367-14	OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL, AIR CONDITIONER	ea	1
	TM 5-2330-305-14	OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL, TSS CHASSIS, SEMITRAILER	ea	1
21	5340-00-682-1505	PADLOCK SET: (38797) MS2131 3-52	se	1
22	5110-00-142-5015	SAW HAND, RIP (39428) 4088B41	ea	1

Section III BASIC ISSUE ITEMS - Cont



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
	7520-00-295-6170	LEAD REPOINTER, PENCIL: (79819) 234	ea	6
16	6675-01-034-3110	LETTERING SET: rapidometric, (scribe, pens, ink) (79819) 3001JS9	se	1
17	6675-01-034-3109	LETTERING SET: (79819) 3038JS5	se	1
	6675-00-190-5854	LINE GUIDE, LETTERING, NONADJUSTABLE: (17866) 2030B6	ea	6
18	6650-00-477-9613	MAGNIFIER: monocular; lamp type (15607) KFM-1/B5D	ea	4
19	6650-00-255-8268	MAGNIFIER: monocular; linen tester (79819) Q8-9518	ea	6
20	6650-00-256-9060	MAGNIFIER: monocular; reading type (79819) Q8-9526	ea	1

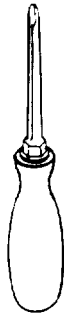
Section III BASIC ISSUE ITEMS - Cont



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
20A	TM 5-6675-321-14	MANUALS, TECHNICAL OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT, TSS MOSAICKING/DRAFTING SECTION	ea	1
	LO 5-6675-321-12	LUBRICATION, ORDER, TSS MOSAICKING/ DRAFTING SECTION	ea	1
	TM 5-6675-321-24P	ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS; AND SPECIAL TOOLS LIST, TSS MOSAICKING/DRAFTING SECTION	ea	1
	TM 5-4120-367-14	OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL, AIR CONDITIONER	ea	1
	TM 5-2330-305-14	OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL, TSS CHASSIS, SEMITRAILER	ea	1
21	5340-00-682-1505	PADLOCK SET: (38797) MS21313-52	se	1
22	Deleted			



Section III BASIC ISSUE ITEMS - Cont



23



25

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
	6675-00-641-5727	SCALE, DRAFTING: (33363) 56-3280	ea	3
	6675-00-641-5724	SCALE, DRAFTING: (79819) 8228-20	ea	6
	6675-00-238-3498	SCALE, DRAFTING: (79819)8230-E12	ea	6
	6675-00-580-5077	SCALE, PLOTTING: (81349) MIL-S-20197	ea	1
	6675-00-283-0027	SCALE, PLOTTING: (81348) GG-S-161	ea	6
	7330-00-680-2636	SCRAPPER, RUBBER (81348) ZZ-S-70	ea	1
23	5120-00-234-8913	SCREWDRIVER, CROSS TIP: size 2 (81348) GGG-S-121	ea	1
24	Deleted			
25	5120-00-234-8910	SCREWDRIVER, FLAT TIP: (78525) 1006	ea	1
26	Deleted			
	7520-00-162-6178	SHARPENER, PENCIL: (79819) U8-1031, Model KS	ea	1
	7510-00-224-7242	SHIELD, ERASING: (81348) GG-S-321	dz	1

Section III BASIC ISSUE ITEMS - Cont

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
	6675-00-641-3561	STEREOSCOPE, LENS, AERIAL PHOTOGRAPH INTERPRETATION: (88997) 2POWERXSTEREOSCOPE	ea	6
	6675-00-641-5752	STRAIGHTEDGE: (81348) GG-S-776, type II	ea	2
		STRAP ASSEMBLY, WEBBING: 3500 in. (98313) 13225 E3695-2	ea	12
		STRAP ASSEMBLY, WEBBING: 45.00 in. (98313) 13225 E3695-3	ea	1
		STRAP ASSEMBLY, WEBBING: 55.00 in. (98313) 13225 E3695-6	ea	4
		STRAP ASSEMBLY, WEBBING: 65.00 in. (98313) 13225 E3695-5	ea	1
		STRAP ASSEMBLY, WEBBING: 94.00 in. (98313) 13225E3695-10	ea	1
		STRAP ASSEMBLY, WEBBING: 29.00 in. (98313) 13225E3695-13	ea	2
		STRAP ASSEMBLY, BUCKLE-END: 6.0 in. (82820) 1844-104	ea	11
		STRAP ASSEMBLY, BUCKLE-END: 7.0 in. (82820) 1844-102	ea	2
		STRAP ASSEMBLY, BUCKLE-END: 8.0 in. (82820) 1844-101	ea	2
		STRAP ASSEMBLY, BUCKLE-END: 9.0 in. (82820) 1844-103	ea	2
		STRAP ASSEMBLY, TIP-END: 8.0 in. (82820) 1845-107	ea	6
		STRAP ASSEMBLY, TIP-END: 36.0 in. (82820) 1845-106	ea	1
		STRAP ASSEMBLY, TIP-END: 40.0 in. (82820) 1845-101	ea	6
		STRAP ASSEMBLY, TIP-END: 58.0 in. (82820) 1845-105	ea	4

Section III BASIC ISSUE ITEMS - Cont



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(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) U/M	(5) Qty Rqr
	6675-00-532-8898	TEMPLATE, DRAFTING: (33363) 61-2300	ea	12
	5140-00-331-5496	TOOL BOX, PORTABLE: 1 fixed hinged tray (75206) CS 19	ea	6
	5140-00-315-2747	TOOL BOX, PORTABLE: 1 removable tray (75206) CS 16	ea	1
	6740-00-224-9679	TRAY, PROCESSING, PHOTOGRAPHIC: (0821 5) 2228-3	ea	1
	6675-00-190-5867	TRIANGLE, DRAFTING: 130 deg; 160 deg (33363) 57-0220, size 10	ea	6
	6675-00-" 90-5863	TRIANGLE, DRAFTING: 130 deg; 160 deg (33363) 57-0220, size 14	ea	6
	6675-00-" 90-5862	TRIANGLE, DRAFTING: 245 degs (33363) 57-0292, size 8	ea	6
	6675-00-190-5864	TRIANGLE, DRAFTING: 245 degs (33363) 57-0292, size 12	ea	6
	6675-00-183-6487	T-SQUARE: (81562) 8068E	ea	2
27	5120-00-224-7271	WISE, PIN: (18037) PVDE	ea	6
28	5120-00-264-3795	WRENCH, ADJUSTABLE: 6.0 in. (80244) GGG-W-631-TY1CL1	ea	1



**APPENDIX D**

**ADDITIONAL AUTHORIZATION LIST**

**Section I INTRODUCTION**

**D-1 . SCOPE.**

This appendix lists additional items you are authorized for the support of the Mosaicking/Drafting Section.

**D-2. GENERAL.**

This list identifies items that do not have to accompany the Mosaicking/Drafting Section and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA or JTA.

**D-3. EXPLANATION OF LISTING.**

National stock numbers, descriptions and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

**Section II ADDITIONAL AUTHORIZATION LIST**

(1) National Stock Number	(2) Description  FSCM and Part Number	(3)  U/M	(4)  Qty Auth
<u>TOE AUTHORIZED ITEMS</u>			
6675-00-543-1292	Supplementary Equipment Set, TOPO Photo	ea	1
5805-00-543-0012	Telephone Set: TA-312/PT	ea	1



## APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

---

## Section I INTRODUCTION

**E-1 . SCOPE.**

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the Mosaicking/Drafting Section. This listing is for information purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except Medical, Class V, Repair Parts and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

**E-2. EXPLANATION OF COLUMNS**

*a. Column (1) - Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, Item 5, Appendix E.").

*b. Column (2) - Level.* This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

*c. Column (3) - National Stock Number.* This is the National stock number assigned to the item; use it to request or requisition the item.

*d. Column (4) - Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

*e. Column (5) - Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by two-character alphabetical abbreviations (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

**Section II EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST**

(1)	(2)	(3) National Stock Number	(4)	(5)
Item Number	Level		Description	U/M
1	O	8040-00-174-2610	Adhesive, Rubber	cn
2	F	8040-00-152-0063	Adhesive, Waterproof	cn
3	C	6810-00-205-6786	Alcohol, Denatured	qt
	C	6510-01-097-3905	Ball, Absorbent Cotton	Pg
	C	7520-00-935-7136	Ball Point Pens, black	dz
	C	7520-00-281-5911	Basket, Wastepaper	ea
	C	5110-00-359-6478	Blade, Craftsman Knife: Beveled	Pg
	C	5110-00-542-2043	Blade, Craftsman Knife: Curved	Pg
	C	5110-00-542-2044	Blade, Craftsman Knife: Square	Pg
	C	5110-00-765-4144	Blade, Craftsman Knife: Stencil	Pg
	C	5110-00-355-6138	Blade, Craftsman Knife: Swivel	ea
	C	8125-01-088-3553	Bottle, Adhesive Dispenser	ea
	C	6530-00-772-0326	Bowl, Surgical Sponge	ea
4	C	6850-00-592-3283	Cleaner, Lens	bk
	C	6850-01-007-8073	Cleaning Concentrate	bt
	C	7510-00-161-4291	Clip, Paper	bx
5	C	8305-00-222-2423	Cloth, Cheesecloth	yd
6	C	6515-00-303-8250	Cotton Swab	bg
7	C	7930-00-530-8067	Detergent, General Purpose	gl
	C	7520-00-285-1772	Dispenser, Pressure Sensitive Adhesive Tape	ea
	C	7510-01-034-1278	Eraser, Film	bx
	C	7510-01-035-1317	Eraser, Kit	kt
	C	7510-00-264-3672	Eraser, Rubber: gritty matl	gr
	C	7510-00-634-3513	Eraser, Rubber: soft	gr



Section II EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST - Cont

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
8	F	5610-00-618-0258	Floor Patch	gl
9	C	7930-00-664-9610	Glass Cleaner	co
	C	8415-00-248-3228	Gloves, Disposable:	bx
10	O	9150-00-190-0904	Grease, GAA	lb
	C		Gum Solution	gl
	C	7510-01-028-2877	Ink, Drawing	bt
	C	7510-01-070-8947	Ink, Drawing	bt
	C	7510-01-039-5075	Ink, Drawing: Carmine Red	bt
	C	7510-01-035-8133	Ink, Drawing: Blue	bt
	C	7510:01-035-8131	Ink, Drawing: Brown	bt
	C	7510-01-035-8132	Ink, Drawing: Green	bt
	C	7510-01-036-3726	Ink, Drawing: Orange	bt
	C	7510-01-080-1481	Ink, Drawing: Red	bt
	C	7510-01-036-3725	Ink, Drawing: Violet	bt
	C	7510-01-035-8130	Ink, Drawing, Yellow	bt
	C	7510-00-285-5863	Lead, Pencil, Graphite: General purpose type: 2H	pk
	C	7510-00-285-5847	Lead, Pencil, Graphite: General Writing type 2H	pk
	C	7510-00-272-9820	Lead, Pencil, Graphite: General purpose type: 3H	pk
	C	7510-00-285-5864	Lead, Pencil, Graphite: General purpose type: 4F	pk
	C	751000-285-5865	Lead, Pencil, Graphite: General purpose type: F	pk
	C	7510-00-285-5866	Lead, Pencil, Graphite: General purpose type:H	pk

Section II EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST - Cent

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
	C	7510-00-281-2143	Lead, Pencil, Graphite: General purpose type: HB	bx
	C	7510-00-285-5862	Lead, Pencil, Graphite: General writing type HB	pk
	O	8315-00-163-1556	Needle, Dressmaker's	pk
11	F	9150-00-273-2389	Oil, Lubricating, General Purpose	cn
	C	7530-00-285-3083	Pad, Writing Paper	pk
	C	7240-00-060-6006	Pail, Utility	ea
12	O	8010-01-131-6254	Paint, Black	kt
12A	O	8010-01-160-6754	Paint, Brown	kt
12B	O	8010-01-162-5578	Paint, Green	kt
13	O	8010-01-248-3859	Paint, Light Green, Interior	gl
	C	5350-00-186-8857	Paper, Abrasive: 1/0	pk
	C	5350-00-188-8856	Paper, Abrasive: 2/0	pk
	C	5350-00-186-8854	Paper, Abrasive: 4/0	pk
14	C	5350-00-619-9166	Paper, Abrasive	pk
	C	6640-00-597-6745	Paper, Lens	pk
	C	7510-00-286-6985	Paperweight	ea
	C	7510-00-233-2027	Pencil: colored; thin lead, blue	dz
	C	7510-00-233-2021	Pencil: colored, thin lead, red	dz
	C	7510-00-240-1526	Pencil: glazed, black	dz
	C	7510-00-436-5210	Pencil: glazed, blue	dz
	C	7510-00-275-7212	Pencil: glazed, green	dz
	C	7510-00-174-3205	Pencil: glazed, red	dz
	C	7520-01-083-6734	Pencil, Mechanical	ea

## Section II EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST - Cont

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
	C	7520-00-161-5664	Pencil, Mechanical	ea
	C	7510-01-030-7427	Pen Point Assortment and Penholder	se
	O	8010-01-193-0520	Primer	kt
	C	7510-00-543-6792	Refill, Ball Point Pen	dz
15	F	8010-01-030-7254	Resin, Epoxy	kt
	C	7510-00-243-3435	Rubber Band	ea
16	O		Screen, Nylon (39428) 101 7A31	ro
17	O	8040-00-851-0211	Sealant, Silicone	tu
	C	5110-00-161-6912	Shears, Straight Trimmers	ea
	O	8010-00-160-6911	Shellac, Cut	qt
18	O	3439-00-273-3722	Solder, Rosin Core	sl
19	O	6850-00-274-5421	Solvent, P-D-680	cn
	C	7920-00-240-2555	Sponge, Cellulose	ea
20	C	6850-00-880-1013	Spray, Silicone	cn
21	O		Sprayfoam Sealant (P/N 7627T1) (39428) 7627T1	cn
	C	7920-00-067-9692	Squeegee: hand use	ea
	C	7520-00-281-5895	Stapler, Paper Fastening, office	ea
	C	7510-00-272-9662	Staples, Paper Fastening	bx
	C	5345-00-265-3126	Stone, Sharpening	ea
22	O	5640-00-103-2254	Tape, Cloth, Duct Sealing, 2 in.	ro
23	C	5970-00-926-7218	Tape, Insulating, Electrical	ro
	C	7510-00-634-1549	Tape, Pressure Sensitive Adhesive: cotton adhesive both sides, 1.0 in. w	ro
	C	7510-00-551-9823	Tape, Pressure Sensitive Adhesive: plastic, 1.0 in. w	ro

Section II EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST - Cont

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
	C	7510-00-198-5831	Tape, Pressure Sensitive Adhesive: 1.0 in, w	ro
	C	7510-01-038-1266	Tape, Pressure Sensitive Adhesive: 2.0 in. w	ro
	C	7510-00-272-6887	Thumbtack	hd
24	C	6640-00-597-6745	Tissue, Lens Cleaning	bk
	C	7920-00-823-9772	Towel, Paper	bx
	C	7510-01-066-2866	Watercolor Set, Artist's	ea
25	C	7510-01-042-7402	Wax, Adhesive, Refills	bx
	C		Wax Refills, Speedcoat Wax	bx
26	C	8040-00-853-8913	Wax Solvent	gl

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**By Order of the Secretary of the Army:**

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**SOMETHING WRONG WITH THIS PUBLICATION?**

THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)  
**PFC JOHN DOE**  
**COA, 3d ENGINEER BN**  
**ET, LEONARDWOOD, MA 63108**  
 DATE SENT

PUBLICATION NUMBER: **TM 5-6675-321-14**      PUBLICATION DATE: **28 June 1985**      PUBLICATION TITLE: **Topographic Support System Mosaicking/Drafting Section**

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
<b>6</b>	<b>2-1 a</b>			<b>In line 6 of paragraph 2-1a the manual states the engine has <u>6</u> cylinders. The engine on my set only has <u>4</u> cylinders. Change the manual to show <u>4</u> cylinders.</b>
<b>B1</b>		<b>4-3</b>		<b>Callout 16 on figure 4-3 is pointing at a <u>bolt</u>. In key to figure 4-3, item 16 is called a <u>shim</u> - Please correct one or the other.</b>
<b>125</b>	<b>line 20</b>			<b>I ordered a gasket, item 19 on figure B-16 by NSN 2 910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN</b>

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER: **JOHN DOE, PFC (268) 317-7111**      SIGN HERE: **JOHN DOE**

DA FORM 2028-2 1 JUL 79

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COMMANDER  
US ARMY TROOP SUPPORT COMMAND  
ATTN: AMSTR-MPS  
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# The Metric System and Equivalents

## Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

## Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 dekagram = 10 grams = .35 ounce  
 1 hectogram = 10 dekagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

## Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

## Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

## Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

## Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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