DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

MOBILE AUDIO VISUAL UNIT AN/MSQ-85

This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1969

CHANGE

No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *30 April 1976.*

Operator's, Organizational, Direct Support,
General Support, and Depot Maintenance Manual
For
MOBILE AUDIO VISUAL UNIT AN/MSQ-85
(NSN 5895937-7100)

TM 11-5895-692-15, 11 March 1969, is changed as follows:
1. The title is changed to read as shown above.
2. A vertical bar appears opposite changed material
3. Remove and insert pages as indicated in the page list below:

Remove	Insert
i and 14	i and 1-0
1-1 and 1-2	1-1 and 1-2
1-6 and 14	1-5 and 14
C-1 through C-4	C-1 through C-2
D-1 through D-10	

4. File this change in front of the publication for reference purpose.

By Order of the Secretary of the Army:

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The Adjutant General

Distribution:
To be distributed in accordance with DA Form 1251 (qty rqr block No. 2545), Operator requirements for AN/MSQ-85.

Change

No.1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *28 February 1974*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT,

GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL

INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

MOBILE AUDIO VISUAL UNIT AN/MSQ-85

TM 11-5895-692-15, 11 March 1969, is changed as follows:

1. A vertical bar appears opposite changed material.
2. Remove and insert pages as indicated in the page list below:

Remove	Insert
i and 1-0	1 and ii (blank)
None	1-0
1-1 and 1-2	1-1 and 1-2
1-5 and 1-6	1-5, 1-6, and 1-6.1
B-1 through B-3	B-1

3. File this change sheet in the front of the manual for reference purposes.

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HISA (ECOM) (18)
Armies (1)
Svc Colleges (1)
Fort Huachuca (5)
WSMR (1)
Fort Carson (5)
USAERDAA (1)
USAERDAW (1)
Army Dep (1) except
LBAD (10)
SAAD (30)
TOAD (14)
ATAD (10)
Gen Dep (Pac) (1)
Sig Sec USA Dep (Pac) (2)
Sig Dep (Pac) (2)
Sig FLDMS (Pac) (1)
Ft Richardson (ECOM Ofc) (1)
USAINTS (2)
Units org under fol TOE:
(1 copy each)
11-158
29-134
29-136

NG: None
USAR: None
For explanation of abbreviations used, see AR 310-50.

WARNING

DANGEROUS VOLTAGES
are used in the operation of this equipment.

DEATH ON CONTACT

May result if safety precautions are not observed.

DANGEROUS AC VOLTAGES ARE PRESENT IN THE FOLLOWING UNITS:

Power unit	240 volts
Power and signal entrance box	115 volts
Power distribution panel and power outlets	115 volts
Battery charger	115 volts
Projector, Motion Picture, Sound AQ-4A(1)	115 volts
Projector, Still Picture AP-9(1)	115 volts
Radio Received R520A/URR	115 volts

VENTILATION IS ESSENTIAL

MOBILE AUDIO VISUAL UNIT AN/MSQ-85 MUST BE VENTILATED AT ALL TIMES WHEN OCCUPIED. DO NOT OPERATE THE GAS HEATER WITH PERSONNEL INSIDE THE SHED, ER. ASPHYXIATION WILL RESULT.

DON'T TAKE CHANCES!

KEEP THE WHIP ANTENNA FOR RADIO RECEIVER R-52OA/URR AWAY FROM HIGH-VOLTAGE SOURCES AND POWERLINES. OBSERVE THE PRECAUTIONS OUTLINED IN TB SIG 291 AT ALL TIMES.

POWER UNIT

BEFORE OPERATION

When filling the fuel tank, always provide a metal-to-metal contact between the filling apparatus and the fuel tank to prevent a spark from being generated as fuel flows over the metallic surface.
Do not operate the power unit until the ground stud terminal has been connected to a suitable ground. Electrical faults in the power unit, load lines, or load equipment can cause death by electrocution from contact with an ungrounded system.
Do not operate the power unit in an enclosed area unless the exhaust gases are piped to the outside.
Inhalation of exhaust fumes will result in serious illness or death.

DURING OPERATION

Do not install or change the load cables while the power unit is operating. The voltage generated by this equipment can cause death by electrocution.
Do not service, make inspections, adjustments, or replace parts while the power unit is operating.

AFTER OPERATION

When filling the fuel tank always provide a metal-to-metal contact between the filling apparatus and the fuel tank to prevent a spark from being generated as fuel flows over the metallic surfaces.

DO NOT FILL ANY OF THE FUEL TANKS WHILE THE GASOLINE ENGINE IS IN OPERATION. GASOLINE SPILLED ON A HOT ENGINE MAY EXPLODE.

WHEN MOVING THE POWER UNIT, USE ALL NECESSARY CAUTION WHEN LIFTING AND MOVING THE EQUIPMENT. THE POWER UNIT WEIGHS 275 POUNDS; IF IT IS NOT UNDER COMPLETE CONTROL, SERIOUS INJURY TO PERSONNEL, OR DAMAGE TO OTHER EQUIPMENT, MAY RESULT.

PA SET LOUDSPEAKER UNIT

If toppling of the PA set loudspeaker unit because of high winds or insecure footing occurs, use guys secured to the loudspeaker mounting frame to hold the loudspeaker unit securely in place.

BATTERY CHARGER SELENIUM RECTIFIERS

When overheated, selenium rectifiers give off poisonous fumes (smell like garlic or rotten eggs) that are harmful to the human body. When the odor is first noticed, shut off the equipment and evacuate the area.

DO NOT reenter the area until it has been well ventilated.

DO NOT handle selenium rectifiers that may have been overheated (even after cooling) with the bare hands.

Technical Manual

NO. 11-5895- 692-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *11 March 1969*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL

SUPPORT, AND DEPOT MAINTENANCE MANUAL

FOR

MOBILE AUDIO VISUAL UNIT AN/MSQ-85
(NSN 5895-00-937-7100)

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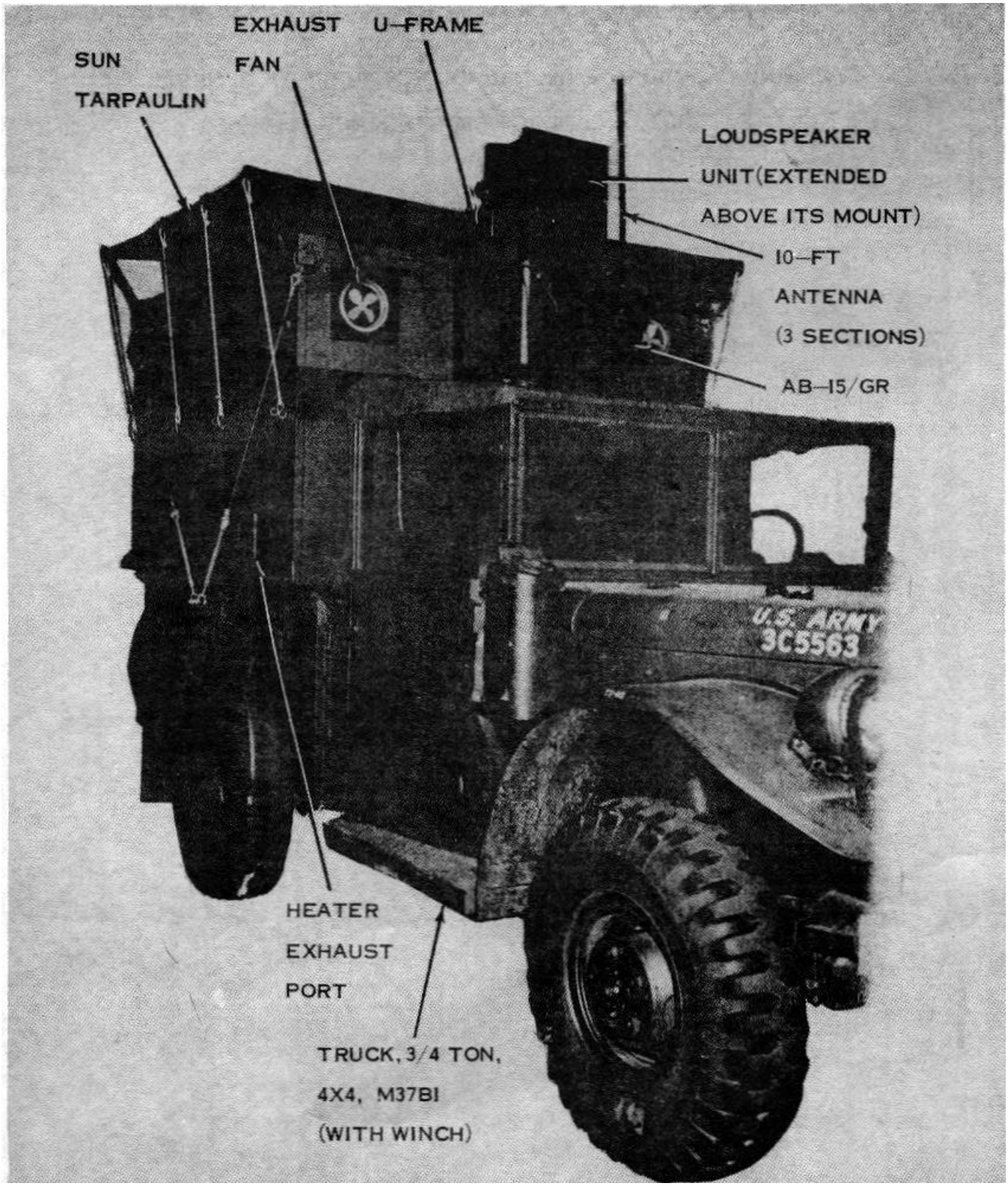

Figure 1-1. Mobile Audio Visual Unit ANIMSQ-8.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This technical manual describes Mobile Audio Visual Unit AN/MSQ85 and covers its installation, operation, functioning, and maintenance. Appendix A lists the technical manuals which cover the individual equipments mounted on or stored in the AN/MSQ85.

b. A basic issue items list (BILL) is given in appendix B, the maintenance allocation chart is given in appendix C. The repair parts and special tools lists for organizational, direct support, general support, and depot maintenance are provided in TM 11-5895-692-24P.

c. Appendix B is current as of 5 May 1973; appendix C is current as of 8 December 1975.

d. The common names govern below are used in this manual for the indicated equipment:

Equipment	*Common name*
Mobile Audio Visual Unit AN/M E	Audio visual unit.
Shelter, Electrical Equip ment S318/G (Modified).	Shelter.
Truck, Cargo, 3/4-Ton, 4X4, M37B1.	Truck
Generator Set, Gasoline, Engine, 3-Kw, Ac 60-Cycle (Military Model SF 3.0 Ml) (FSN 6115-07-1640 or FSN 6115 913-9290).	Power unit.
Public Address Set AN/ UIH-6	PA set.
Projector, Motion Picture, Sound AQ4A(l).	Movie projector
Projector, Still Picture AP-9(1)	Slide projectors [b]
Screen, Projection BM-22A.	Large screen [b]
Screen, Projector BM-l0A.	Small screen [b]
Recorder-Reproducer Set, Sound AN/UNH-10.	Tape recorders [a]
Radio Receiver R-520A/ URR	Radio [a]
Camera, Still Picture, Polaroid Model 250.	Camera [b]
Heater, Space, Nonelectric, Hunter Model UH48.	Heater.
Power Supply, Electro Products Laboratories, Model EF.	Battery charger.

[a] Main audio components
[b] Main visual display components

1-2. Indexes of Publications

a. *DA Pam 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. *DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies.

Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-581 NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 75-18/MCO P4610.19B, and DSAR 4500.15.

1-3.1 Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms), and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-Q, Fort Monmouth, NJ 07703.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

a. Purpose. Mobile Audio Visual Unit AN/ MSQ-85 (fig. 1-1) is an assembly of audio and visual aid equipments mounted on, or stored in, Shelter, Electrical Equipment S318/G (Modified). The shelter is placed on the cargo bed of a 3/4-ton, 4x4, M37B-1 cargo truck that is provided with a winch.

b. Use.

(1) The AN/MSQ-85 is used to provide audio, visual, or audio-visual programming and entertainment to friendly personnel in remote areas. The truck is provided to make the entire audio-visual unit extremely mobile. The programming and entertainment may be presented to allied or other friendly personnel, or possibly for troop information and entertainment, in non-urban areas. Where commercial power for operating the audio-visual equipments is unavailable, a portable power unit is used for supplying the power needs of the equipment.

(2) The AN/MSQ-85 is also used in tactical situations; for example, it may be used in military police operations for control of civilian populations, or for directing military personnel in the performance of their duties through the public address (PA) set. Other applications of the AN/ MSQ-85 are left to the direction of the commanding officer charged with responsibility for the mission of the AN/MSQ-5.

(3) The main audio components consist of a PA set, a broadcast-band radio, and a tape recorder. Either the tape recorder or the PA set may use the external loudspeaker unit on the front of the shelter; however, live broadcasting from the radio to the external loudspeaker unit cannot be accomplished. Radio programs must first be recorded on tape where they may be monitored before public playback, permitting screening of the radio program to assure quality and accurate programming. Operation of the audio components is described in paragraph 3-12.

(4) The visual display equipment consists of a movie projector, a slide projector, a Polaroid camera, a small screen, and. a large screen. The equipment is designed to be operated out of doors, although the slide projector may be operated from within the shelter if desired. Additional lenses for use with the movie projector include an anamorphic (cinemascope) lens and a zoom lens; a lens adaptor is also included. A zoom lens for enlarging images is also available for the slide projector. Operation of the visual components is described in paragraphs 3-10 and 3-11.

(5) A portable gasoline engine generator (power unit) is provided for supplying 115 volts alternating current (ac) to the equipment when it is located in remote areas. When not in use, the power unit is stored inside the shelter; clamps are used to secure the power unit to the shelter floor during transit. A block and tackle assembly permits the power unit to be removed from and replaced in the shelter with as few as two persons. Operation of the power unit is described in TM 5-6115-271-15.

(6) A gasoline-operated heater is provided in the shelter to help keep the equipment dry, not to provide warmth for personnel. In moist climates, the shelter may be closed and the heater ignited; the resulting rise in temperature increases the ability of the air to contain more moisture, decreasing the relative humidity and promoting drying action. A thermostat prevents the inside of the shelter from overheating when the heater is used. Further information on the heater is given in paragraph 3-16.

(7) To increase the operating time for the heater and the power unit, additional fuel cans are mounted on a rack at the rear of the shelter.

(8) A battery charger is provided for recharging the nickel-cadmium battery in the PA set. The tape recorder has its own self-contained, battery-charging circuitry.

1-5. Technical Characteristics

a. Overall Shelter Power Requirements.

Movie projector	*1,300 watts, 115 volts ac, 50 to 66 cps*
Slide projector	*510 watts, 115 volts ac, 50 to 60 cps.*
Radio	*10 watts, 115 volts ac, 50 to 60 cps*
Tape recorder	*0 watts, 116 volts ac, 50 to 60 cps (to charge batteries).*
PA set	*28 volts dc (nominal) (24 to 82 volts de).*
Battery charger (for PA set).	*265 watts, 115 volts ac, 50 to 60 cps (normal wattage rating while charging battery).*
Shelter lighting	*100 watts, 115 volts ac, 50 to 60 cps.*
Exhaust fans (two)	*800 watts, 115 volts ac, 60 cps.*
Total wattage of shelter	*2,495 watts, ac*

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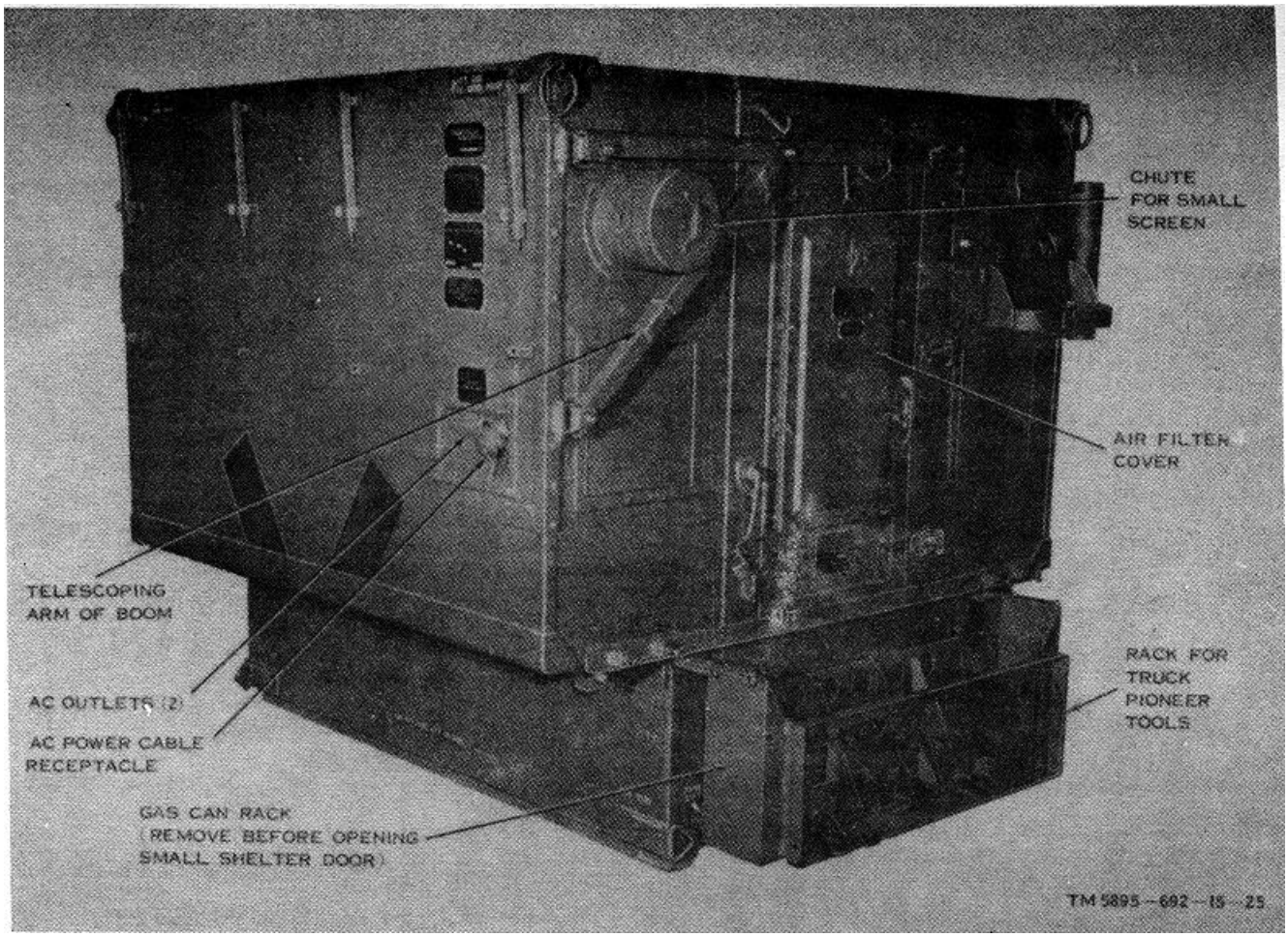


Figure 1-2. Shelter, Electrical Equipment S-138/G (Modified), front door mew.

b. Radio Receiver R520A/URR.

Band:	***Frequency -range***
Broadcast	- 540 to 1,600 kc (555 to 187 meters).
2 to 4 mc	2 to 4 me (160 to 75 meters).
4 to 8 mc	-4 to 8 mc (75 to 37-1/2 meters).
31 meters	9.4 to 9.8 mc.
25 meters	11.6 to 12 mc.
19 meters	14.9 to 15.5 mc.
16 meters	17.5 to 18.1 mc.
Receiver type	Superheterodyne.
Type of signal that can be received	Am.
Intermediate frequency	455 kc.
Number of tubes	5.
Rectifier	-Selenium.
Thermal resistor	Glass-inclosed.
Power input (battery):	
A battery	9 volts at 67 ma.
B battery	90 volts at 17 ma.
Power input (power line):	
117 volts ac	10 watts.
117 volts de	7.5 watts.
230 volts ac	20 watts.
230 volts dc	15 watts.

Antennas:

Loop	Fastened to inside of front cover. Removable to provide reception in steel buildings and vehicles. Used on broadcast band.
Whip	61 inches long (extended); eight telescoped sections. Switched into antenna circuit when any one of short-wave buttons is pressed.
Ling-wire	Antenna and ground terminals provided at rear of receiver for connecting external antenna (not supplied) and ground, to assure maximum signal pick-up in very weak signal areas. Mast Base AB-15/GR with whip antenna sections (fig. 1-1) as used for this purpose in the audio-visual unit.

Headset	Jack at rear of speaker accomodates Connector, Plug PJ-055 for low-impedance headset connection (plug, cord, and headset not supplied).
Band selector	Seven band-selector buttons on the front panel provide for selecting band covering desired frequency range.
Tone control	Four, tone-control buttons located below dial scale on front panel permit section of 16 different tonal combinations.
Weight	20 pounds, less batteries.
Battery	Type Z985 (not supplied). Single battery pack consisting of 9 volts A and 90 volts B supply. or One 90-volt B Battery BA-42S/U and three 3-volt A Batteries BA-407/U. or Three 90-volt B Batteries BA-270/U and six 1.5-volt A Batteries BA-S0/U.

c. Public Address Set AN/UIH-5.

Weight	Approximately 45 lb.
Supply voltage	Nominal, 28 volts dc (24 to 32 volts dc, maximum), with negative ground.
Power supply internal impedance	-Maximum, 0.10 ohm from 0 to 5,000 cycles per second.
Rated power output	250 watts into resistive load of 1.75 ohms with standard input.
Input signal levels	For rated power output, input signal levels are required as follows: Microphone input: 0.010 volt rms, 1,000 cps. Recorder-line input: Low impedance: 0.100 volt rms, 1,000 cps. High impedance: 0.300 volt rms, 1,000 cps.
Input impedance	Microphone: 50 ohms (pins A, B, and C). Recorder-line: Low Z: 600 ohms balanced (pins B and C). High Z: 2,000 ohms (pins A and C).
Output impedance	Resistive, 1.75 ohms, Nominal loudspeaker, 2 ohms.
Frequency response	±3 db from 500 to 5,000 cps with 0.010 volt at MIC receptacle.
Harmonic distortion	Less than 12-perent at 0.4-percent rated power output into standard resistive load of 1.76 ohms with dine wave input of 1,000 cps.
Temperature	30° F to +140° F (-35°C to +60°C).
Altitude	-Maximum, 12,000 feet above sea level

d. Recorder-Reproducer Set, Sound AN/UNH10.

Number of tubes	1.
Number of transistor	15.
Number of diodes	4.
Number of thermistor	1
Frequency response	±2 db, 100 to 8,750 cps.
Recording medium	1/4-inch magnetic tape mounted on 5-inch diameter rods.
Recording medium tracks	2 on each tape.
Recording or playing time per reel.	-1 hour.
Tape speeds (playback and recording.)	3-3/4 inches per second.
Line voltage input requirements	115 volts ±5, 50 to 60 cps.
Line power consumption	10 watts.
Battery charger power output	360 milliamperes, constant current
PHONES jack input impedance	-8 ohms.
INPUT/OUTPUT connector input impedance.	600 ohms minimum.
Signal input to INPUT/OUTPUT connector.	0 dbm maximum (0.78 volt).
MIC connector input impedance	50 ohms.
Battery BB412/U cells:	
Cells per battery	8.
Type	Rechargeable, sealed, nickel-cadmium
Voltage	Approximately 11.5 volts.
Capacity	4 amperes-hours
Microphone, Dynamic M-119/UNH-10:	
Impedance	50 ohms
Frequency range	60 to 18,000 cps.
Sensitivity	67 db re 1 mv per 10 dynes/cm^2.
Headset, Electrical H-224/UNH-10:	
Impedance	-2,000 ohms.
Frequency range	50 to 6,500 cps.
Sensitivity	-88 db above 0.0002 dynes/cm^2 for 10-mw input
Temperature range for normal operation:	
High	12 F (48.9° C).
Low.....	- 0° F (-17.8° C).

e. Projector, Motion Picture, Sound AQ-4A (1).

Projector section:	
Power requirement....	105 to 129 volts, 50 to 65 cps, 1,300 watts maximum.

Drive motor speed .... 5,554 rpm, governor-controlled.
Exciter lamp..... 6 volts, 1 ampere
Film projection speed 24 frames per second.
Fuse (2 used) ..... 1 5 amperes, 250 volts
Photoelectric cell..... Germanium diode, photo. resistive.
Projection lamp..... 115 volts, 750 watts.
Projection lens ..... F/L6, 2-inch focal length.
Reel capacity . ..... 2,000 feet (1,600-foot reel supplied).
Photoelectric cell supply voltage . ..... 26 volts (±20 percent).
Threading lamp..... 120 volts, 6 watts.
Ventilation rotor..... 24 blades, 3-inch diameter.
Soundhead output impedance..... 0.25 megohms.

Projector amplifier section:
Fuse . ... 0.8 ampere, 250 volts
Indicator lamp..... . 6 volts, 0.20 ampere.
Input signal . ..... 0.2 volt.
Output power . ..... 7 1/2 watts, 2-percent maximum distortion(at 100 to 7,000 cps)
Frequency response.. Flat response ± 2-1/2 db from 70 to 10,000 cps.
Overall signal-to-noise ratio..... 40 db at rated output of 400 cps and maximum gain.
Tone control!
HI range ..... Accentuation: +6 db ±2 at 3,500 cps. Attenuation: 5 db±:2 at 5,000 cps
LO range . ... Attenuation: -10 db minimum at 5,000 cps.
Volume control..... 20-db reserve gain at rated output of 400 cps.
Speaker section ..... 6inch, 10-watt, permanent magnet, 8-ohm impedance.
Loudspeaker unit, permanent magnet:
Type..... . 8-inch, 26-watt, permanent magnet.
Impedance ..... . 16 ohms.
Frequency response . Flat response ±5 db from 160 to 6,000 cps.

f. Battery Charger (Power Supply, Filtered DC, Electro Products) Laboratories, Model EF.

NOTE

This component is a power supply used as a battery charger for the nickel-cadmium battery used with, but not part 0f, the PA set

Input supply voltage..... . 110 to 120 volts, 50 to 60 cps
Maximum input supply voltage ..... 125 volts ac.
Power consumption (approx) ..... 265 watts (at 5 amperes, 28 volts dc).
Rectifiers . ..... Selenium (full-wave bridge)
Maximum continuous output current . ..... 5 amperes.
Maximum intermittent output current..... 10 amperes.
Output volts (variable)..... .0 to 28 volts do
Ripple Less than 1 percent (6 amperes max)
Fuse . 3 amperes
Output power wire gage ... No. 14 or No. 16 wire.
Minimum output current (approx ..... 1/4 ampere
Maximum operating temperature..... 150° F (66° C
Maximum surrounding temperature..... 100° F (38° C

g. Nickel-Cadmium Rechargeable Batter (in PA Set).

Temperature range (charging)..... -65° to + 165° F (-54° to +74° c
Specific gravity of electrolyte ..... .1.24 to 130.
Chargingtime..... 45 hours (appro4
Charge voltage per cell .... .1.6 volts
Maximum charge voltage per cell..... 1.72 volt
Battery output voltage..... 28 volts.
Number of cells..... . 20.
Constant current for 7-hour charging..... . 1.5 amperes.
Capacity (6-hour charging rate)..... 7.5 ampere hours

h. Projector, Still Picture AP-9(1).

Type . Still picture projector.
Film size:
Filmstrip ..... 35 mm, single or double frame.
Slides . ..... 35 mm, single or double frame, 2- by 2-inch mounted.
Lens:
Projection:
Type..... Anastigmatic
Focal length ..... 5 inches
Speed..... F/3.5.
Condensing..... One biconvex, and one plano convex with a heat absorb. Ing filter between them.
Image size (projected):
Single frame:
Minimum . ..... 6 inches wide by 4 inches high
Maximum ..... 18 feet, 1 inch wide by 12 feet, 6 inches high
Double frame:
Minimum . ..... 8 inches wide by 6 inches high.
Maximum . ..... 26 feet, 8 inches wide by 18 feet, 8 inches high.
Distance to screen:
Minimum ..... 3 feet.
Maximum ..... 100 feet.
Ventilation ..... Motordriven fan.
Power requirements 115 volts ac.
Power consumed 510 watts.

i. Telephone Set TA-312/PT.

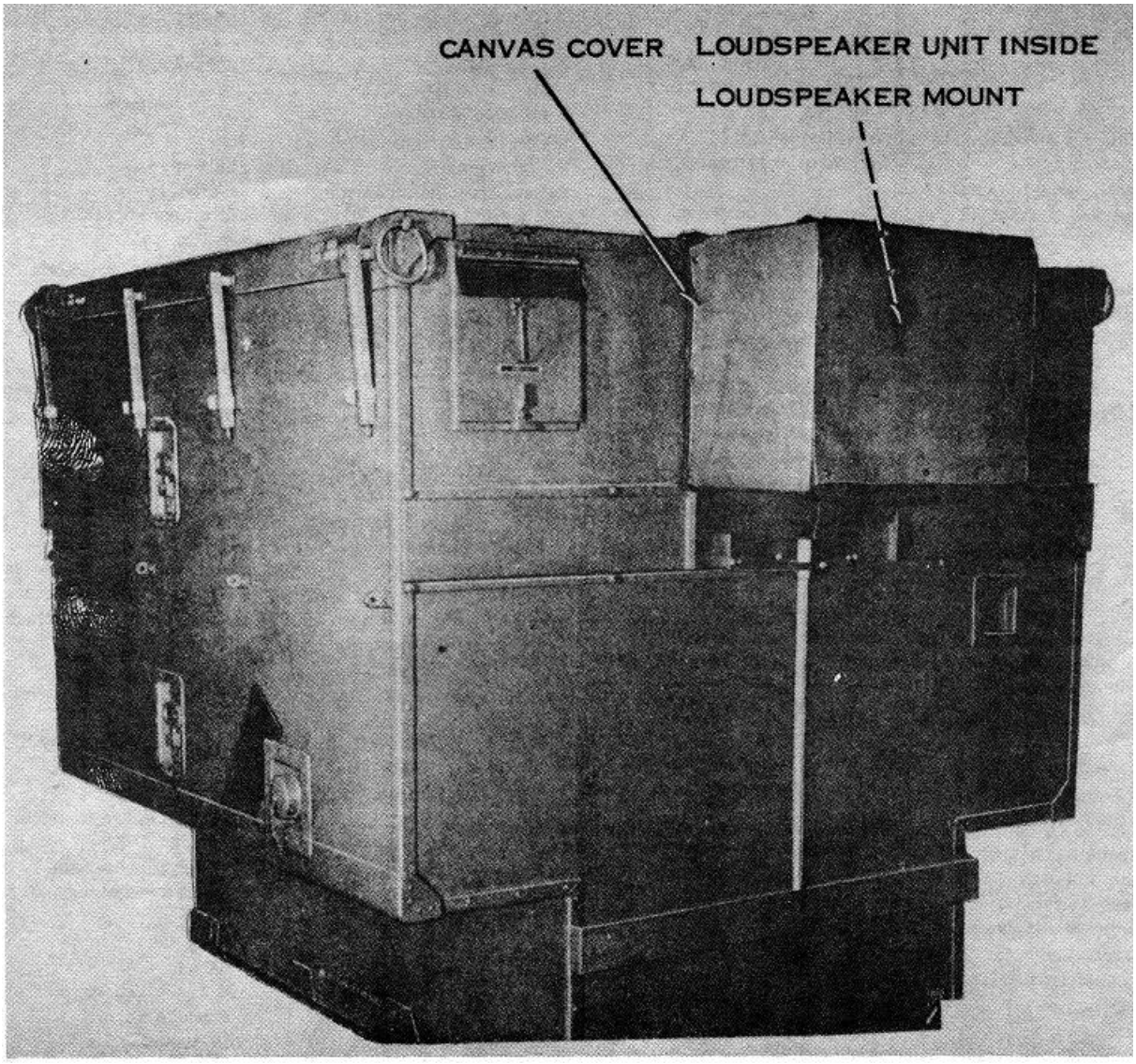
Types of operation..... . Common battery (talking and signaling) (CB).
Local battery (talking and

	signaling with hand generator) (LB). Local battery (talking and signaling with common battery) (CBS)
Power source	. 3 volts dc (provided by two Batteries BA4J or external volt dc source)
Frequency range	300 to 3,200 cps
Signaling voltage	. 90 to 100 volts ac, 20 cps; from hand-ringing generator.
Talking distance (approx)	20 miles (approx) with field wire (32 kilometers (approx).

j. Camera, Still Picture, Polaroid Model 250. Polaroid model 260 (Camera Set, Still Picture KS-101A) is similar to Polaroid model 100, with the exception of the rangefinder used to focus the lens Refer to TM 11-6720-234-15 for technical characteristics of the Polaroid model 100 camera, and to TM 116720-239-12 for the Polaroid 250 camera

k. Truck, Cargo, 3/4-Ton, M37B1 (with Winch). Refer to TM 9-8031-2 for technical characteristics of the truck.

L. Generator Set, Gasoline Engine, 3Kw, 60 Cycle. Refer to TM 5-6115-271-14 for technical characteristics of the power unit.



TM 5895-692-15-24

Figure 1-3. Shelter, Electrical Equipment S-138/G (Modified), front view.

1-6. Items Comprising an Operable Mobile Audio Visual Unit AN/M-85

FSN	*QTY*	*Nomenclature, part No., and mfr. code*	*Figure No.*

NOTE

The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency , etc.

5895-937-7100		Mobile Audio Visual Unit AN/MSQ-85 (This item is Nonexpendable) consisting of:	1-1
3940-879-5772	1	Block Pulley: 3159Z3; 39428	3-6
5995-877-3724	1	Cable Assembly, Power Electrical: SC-C-622029; 80063	3-3
5995-879-3738	1	Cable Assembly, Power Electrical: SC-C-622028; 80063	3-3
5995-879-3753	1	Cable Assembly, Power Electrical: SC-C-622026; 80063	
5995-879-3752	1	Cable Assembly, Power Electrical: SC-C-622025; 80063	
5995-879-3751	1	Cable Assembly, Special Purpose Electrical: SC-C-622024; 80063	
5995-879-3739	1	Cable Assembly, Special Purpose Electrical: SC-C-622030; 80063	
5995-879-3718	1	Cable Assembly, Power Electrical: SC-C-622031; 80063	
6720-935-3799	1	Camera, Still Picture: MOD 250; 47904	1-8
7105-269-8463	2	Chair Folding: 53; 02860	3-3
6605-283-0346	1	Compass, Magnetic	
5995-879-3762	1	Cord Extension: SC-C-622027; 80063	
5995-879-3732	1	Cord Extension: SC-C-622032; 80063	3-20
4230-720-1618	1	Decontaminating Apparatus, Portable: DSL 1-1/2 QT D5-51-268; 81361	1-5
7520-885-0000	1	Duplicator Kit: 51; 42004	
7240-222-3088	4	Drum, Fuel, 5 Gal.: 5208; 81902	
6220-264-8261	1	Flashlight, Plastic: MX-991/U	1-10
6230-879-3622	2	Floodlight: 5326DE; 07023	1-10
6115-913-9290	1	Generator Set Gasoline Engine Driven, 3 KW 60 CPS; 81349	3-3
4520-709-9222	1	Heater, Space-Nonelectric: UH-48; 92878	1-8
6760-878-0590	1	Lens, Projection, Multifocal: 6043; 82394	
6760-878-8051	1	Lens, Projection: 020409; 06650	
6760-089-8452	1	Lens, Projection, Special: 02043; 93319	
5965-782-5410	2	Loudspeaker: SC-C-622065; 80063	1-5
5985-221-5544	1	Mast Base AB-15/GR: SC-D-12517; 80063	1-1
5820-199-8831	1	Mast Section MS-116A: SC-D-12517; 80063	1-1
5820-199-8843	1	Mast Section MS-117A: SC-D-12517; 80063	1-1
5820-199-8841	1	Mast Section MS-118A: SC-C-12517; 80063	1-1
6130-878-8318	1	Power Supply: Model EF; 81692	1-6
6730-889-3393	1	Projector, Motion Picture, Sound AQ-4A(1); 06650	1-10
6730-598-8534	1	Projector, Slide AP-9(1); 06650	1-5
5820-082-4126	1	Public Address Set AN/UIH-5	1-1
5820-503-1403	1	Radio Receiver R-520A/URR	1-8
5835-082-3842	1	Recorder-Reproducer Set Sound AN/UNH-10	1-4
6730-577-4813	1	Screen, Projection: BM-10; 80111	1-5
6730-933-4871	1	Screen, Projection: BM-22A; 80111	3-9
5140-763-2339	1	Shelter, Electrical Equipment S-318/G	1-2
5835-695-7161	1	Splicer, Magnetic: TS-1439; 82680	
6740-291-5840	1	Splicer, Photographic Film: HM-6; 43268	
	1	Stand, Projector: ESS 200906; 14850	3-20
	1	Tarpaulin: Dwg. No ES DL-195415	1-1
5805-543-0012	1	Telephone Set TA 312/PT	1-8
2320-835-8323	1	Truck 3/4 Ton M-37B1, with Winch: 8358323; 19207	1-1
7430-254-4319	1	Typewriter, Portable, Elite 42 Keys: Type No. 5; 50456	1-4

1-7. Description

a. Shelter, Electrical Equipment S-318/G (Modified). The shelter includes alternating current (ac) and direct current (dc) lighting and power circuitry, and mounting and storage facilities for all components of the audio visual unit.

(1) *Ac circuitry* (fig. 5-1). The ac power circuitry includes the power distribution panel (fig. 1-5), fluorescent lighting fixtures, and ac outlets for the components. An ac power cable receptacle and two outlets are provided on the outside of the shelter (fig. 1-2).

(2) *Dc circuitry* (fig. 5-2). The dc circuitry includes a battery charger (fig. 1-6), a dc control box, a 24-volt emergency dome light in the shelter ceiling (fig. 1-5), and a dc power cable to connect the dc control box to the truck battery.

(3) *Ventilation and dehumidifying*. Two exhaust fans, mounted on the front wall (fig. 1-1), provide ventilation. Dehumidifying is furnished by a heater (fig. 1-8).

(4) *Gasoline storage*. A 5-gallon gas can, mounted on a rack at the rear of the shelter (fig. 1-9), contains the heater fuel. An adapter provides connection from the heater gas can to the tubing which leads to the heater (fig. 1-10). Three 5-gallon gas cans, mounted in the rack at the rear of the shelter (fig. 1-2), provide storage for the power unit fuel.

(5) *Lifting boom*. A boom with block and tackle (fig. 1-2 and 3-6) lifts the power unit into and out of the shelter (fig. 3-4).

(6) *Sun tarpaulin*. Brackets and catches are mounted on the sides of the shelter for installation of the sun tarpaulin (fig. 1-1).

(7) *Loudspeaker mount*. The loudspeaker mount (fig. 1-1) is provided to mount the loudspeaker unit of the PA set. A canvas dust cover protects the loudspeaker when it is not being used (fig. 1-3). The loudspeaker may be operated either with the front clasp of the canvas cover open, or with the entire canvas cover removed from the mount.

(8) *Wall openings*. The shelter openings are as follows:

(*a*) The front wall includes two exhaust fans vents with hinged covers (fig. 1-1). A cable entrance opening in the front wall (fig. 1-6) provides passage for the dc power cable connected to the truck battery in the truck cab and for the cable of the remote control unit of the PA set when the unit is mounted in the truck cab.

(*b*) The openings for the slide and movie projectors are in the rear wall.

(*c*) A heater exhaust port with a screw-on cap is behind the heater (fig. 1-1).

(9) Storage.

(*a*) Shelves, inside the shelter, are used to mount the components and provide stowage facilities.

(*b*) Clamping devices hold the slide projector (fig. 1-5), the movie projector (fig. 1-4), the battery charger (fig. 1-6), the large screen cases (figs. 1-4 and 1-7), the amplifier rack for the PA set (fig. 1-6), and the power unit (fig. 3-3).

(*c*) Storage boxes and other components are also held in place on the shelves with stretchable cords.

b. Operating Components. Refer to the appropriate technical manual (appx A) for a description of the truck, the power unit, and the operating components of the audio-visual unit.

1-8. Equipment Modifications

a. Shelter, Electrical Equipment S-318/G (Modified). In addition to the modifications described in paragraph 1-7a, the shelter has been modified as follows:

(1) A stainless steel floor is used.

(2) The doorsill is strengthened.

(3) A covered cylindrical chute is provided at the rear wall -(fig. 1-2) for removal and insertion of the small screen (fig. 1-5 and 1-6).

(4) A 2- by 4-inch board is bolted to the base of the front wall on the outside of the shelter (fig. 3-1) to provide clearance between the shelter and the truck bed. The space provides room for the aft of the loudspeaker between the shelter and the body of the truck bed when the loudspeaker is fully lowered into its mount (fig. 1-3).

(5) Tarpaulin brackets are installed on the outside of the shelter.

b. PA Set. Fixed mounting bracket AEM-MB1 (TM 11-5830-240-15) is not included with the PA set. The shaft mounting and locking portion of the AEM-MB-2 has been altered and integrated into the loudspeaker mount on the front of the shelter (fig. 1-3). The hollow mounting shaft of the loudspeaker unit has been removed and replaced by a solid shaft approximately 12 inches longer, which is welded to the upper section of the mounting bracket. A remote control mounting bracket (thumbscrew installation) is provided to enable the PA set remote control unit to be mounted in the truck cab. The output of the tape recorder may be applied to the PA set with a

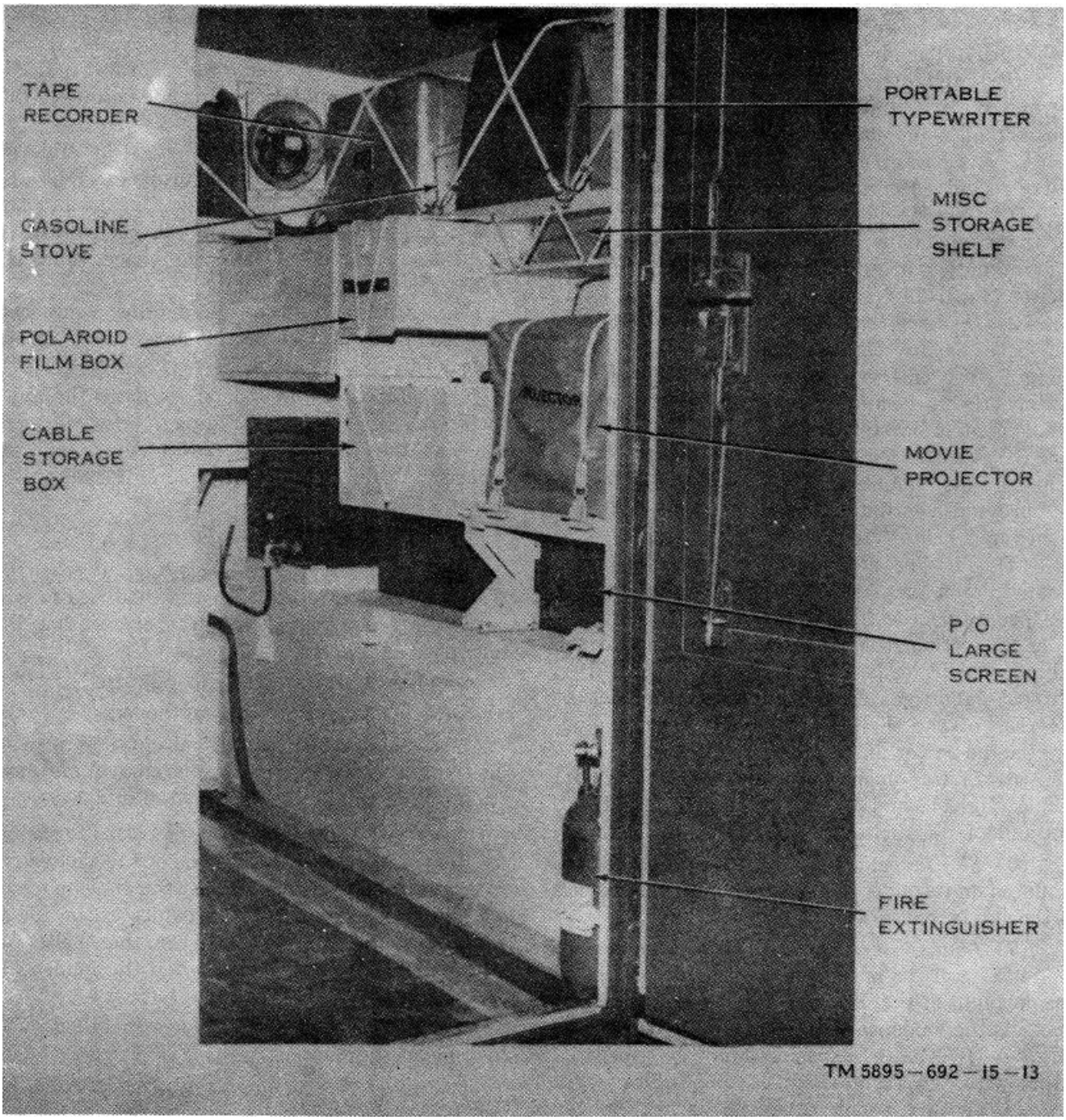


Figure 1-4. Inside shelter, curbside equipment.

special patch cable that has a black Connector, Plug PJ055B on one end (fig. 3-21).

c. Movie Projector.

(1) *Loudspeaker.* The loudspeaker, cables, and cable receptacles have been removed from their original cases. Each loudspeaker is mounted in a smaller and lighter case and is connected to two receptacle connectors mounted on the case. The original loudspeaker cable is replaced by a lightweight cable that includes a cable connector 1-8 at each end. The fabric loudspeaker covers are not provided.

(2) *Projector*. An anamorphic (cinemascope) lens, a Multifocal (zoom) lens, and a lens adapter are provided with the audio-visual unit for use with the movie projector.

d. Slide Projector. A zoom lens is provided with the audio visual unit for the slide projector to enlarge the viewed image.

e. Screens. For Screen, Projection BM-22A (large screen), a kit has been provided to strengthen the large screen framework and to provide more guys.

f. Truck. A plate is mounted on the top of each fender to hold the sling assemblies that hold the shelter on the truck (fig. 3-2). The pioneer tools rack has been removed from the truck tailgate and mounted on the rack for the three gas cans (fig. 1-2).

g. Radio. An antenna bracket is bolted, to the front of the shelter to mount Mast Base AB-15/ GR. From the AB-15/GR, an antenna lead-in wire is connected to the radio for better long-range reception. The output of the radio may be connected to the tape recorder with a special patch cable that has a red Connector, Plug PJ055B on one end (fig. 3-21).

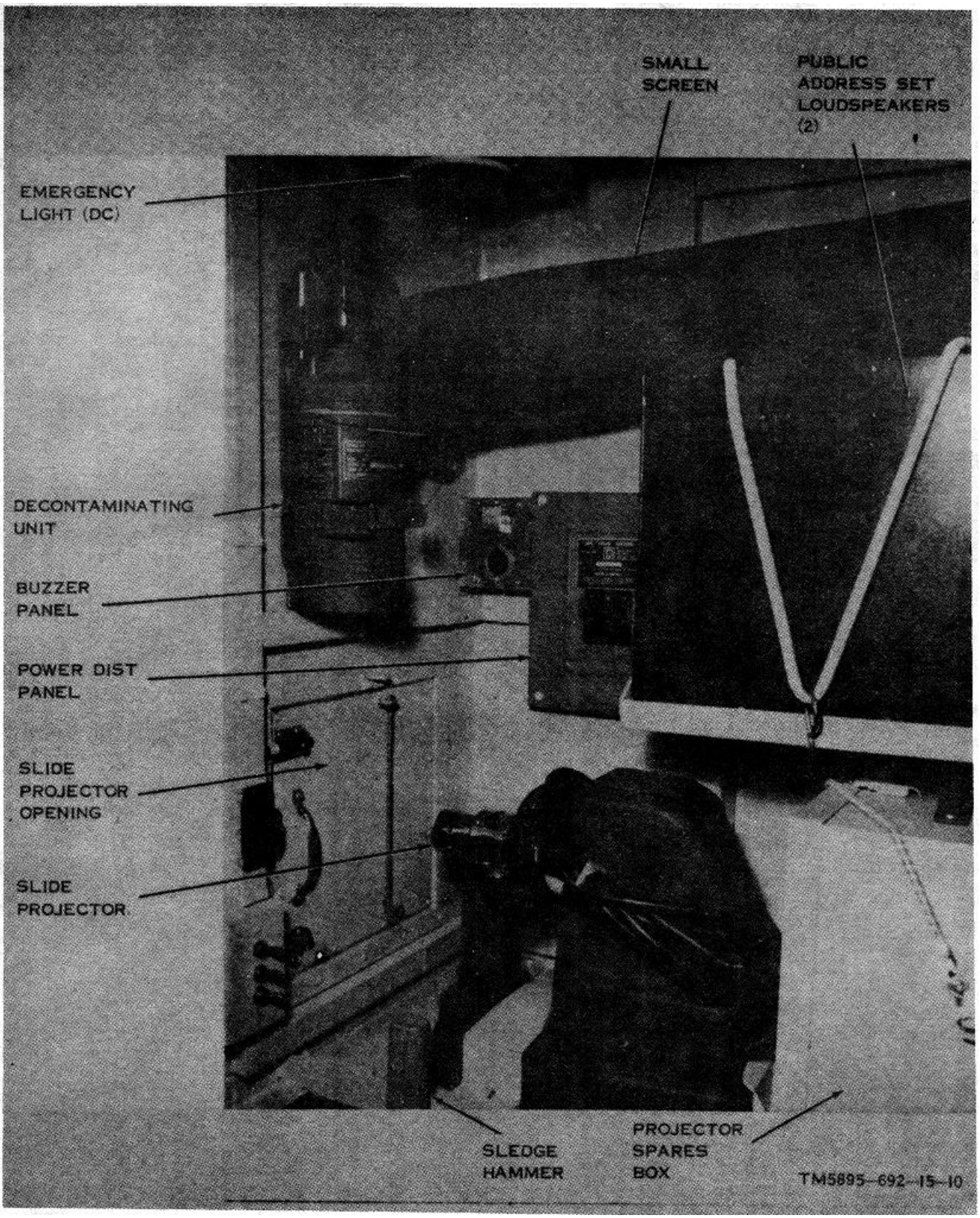


Figure 1-5. Inside shelter, slide projector area.

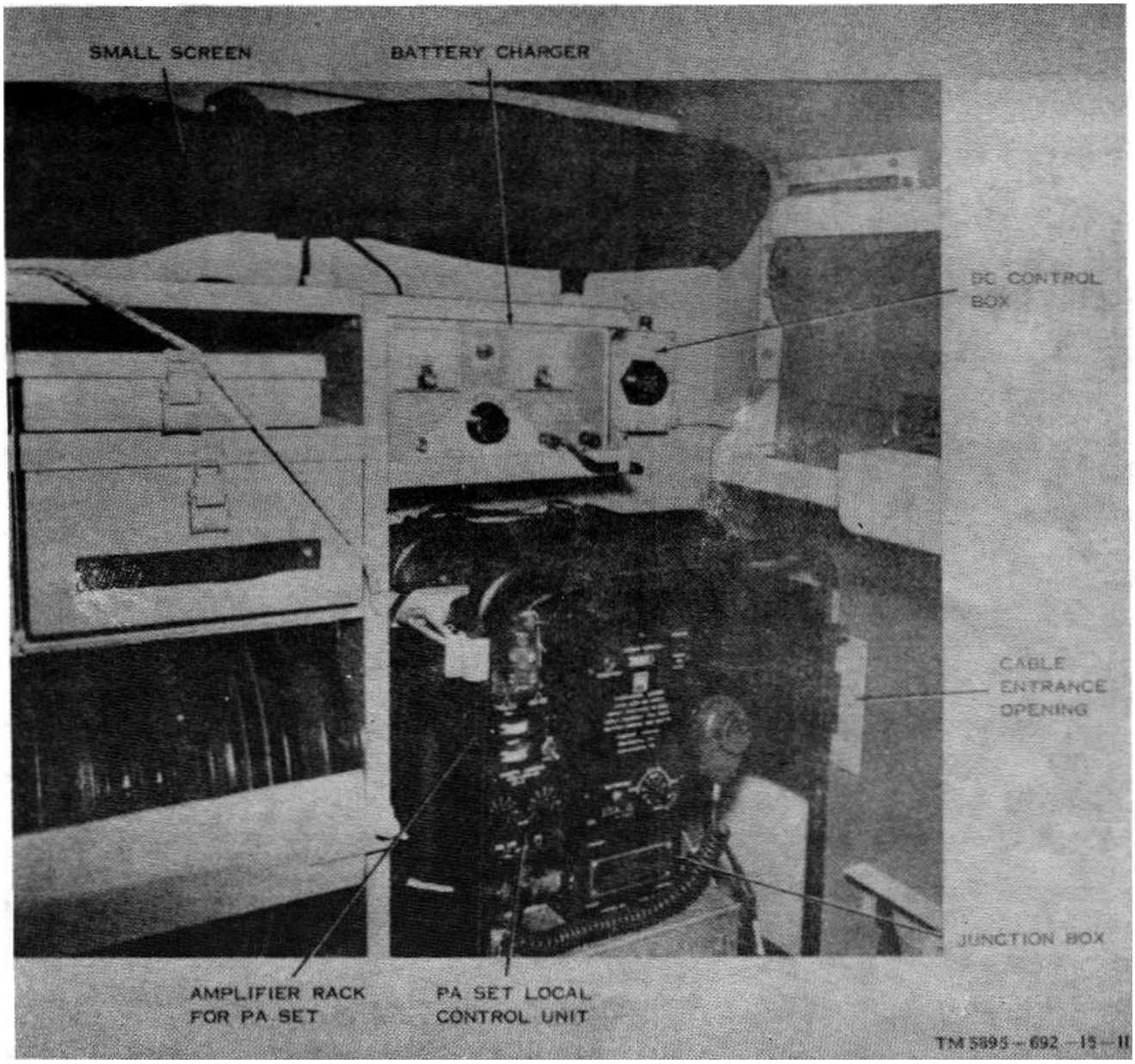


Figure 1-6. Inside shelter, PA set area.

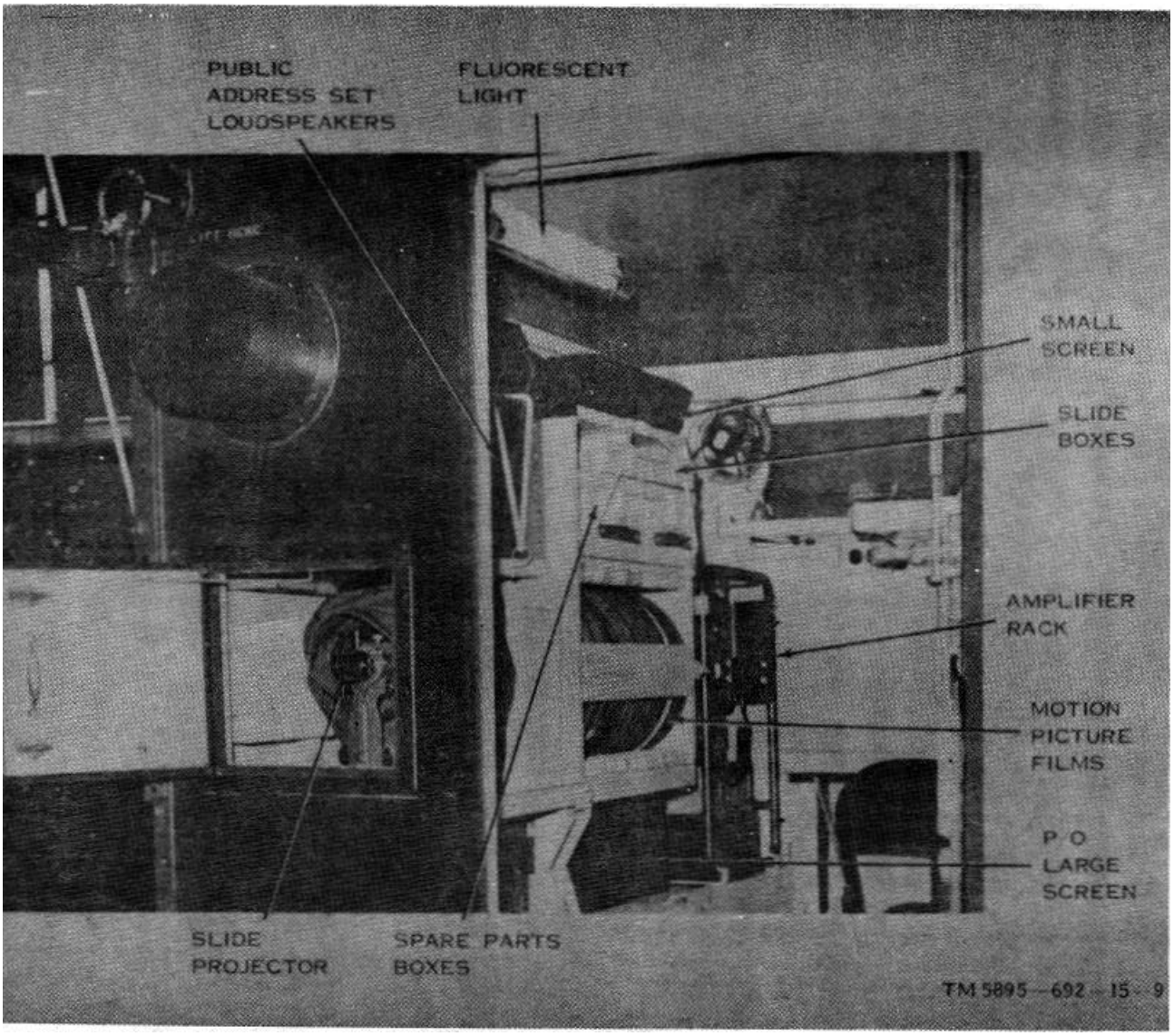


Figure 1-7. Inside shelter, roadside equipment.

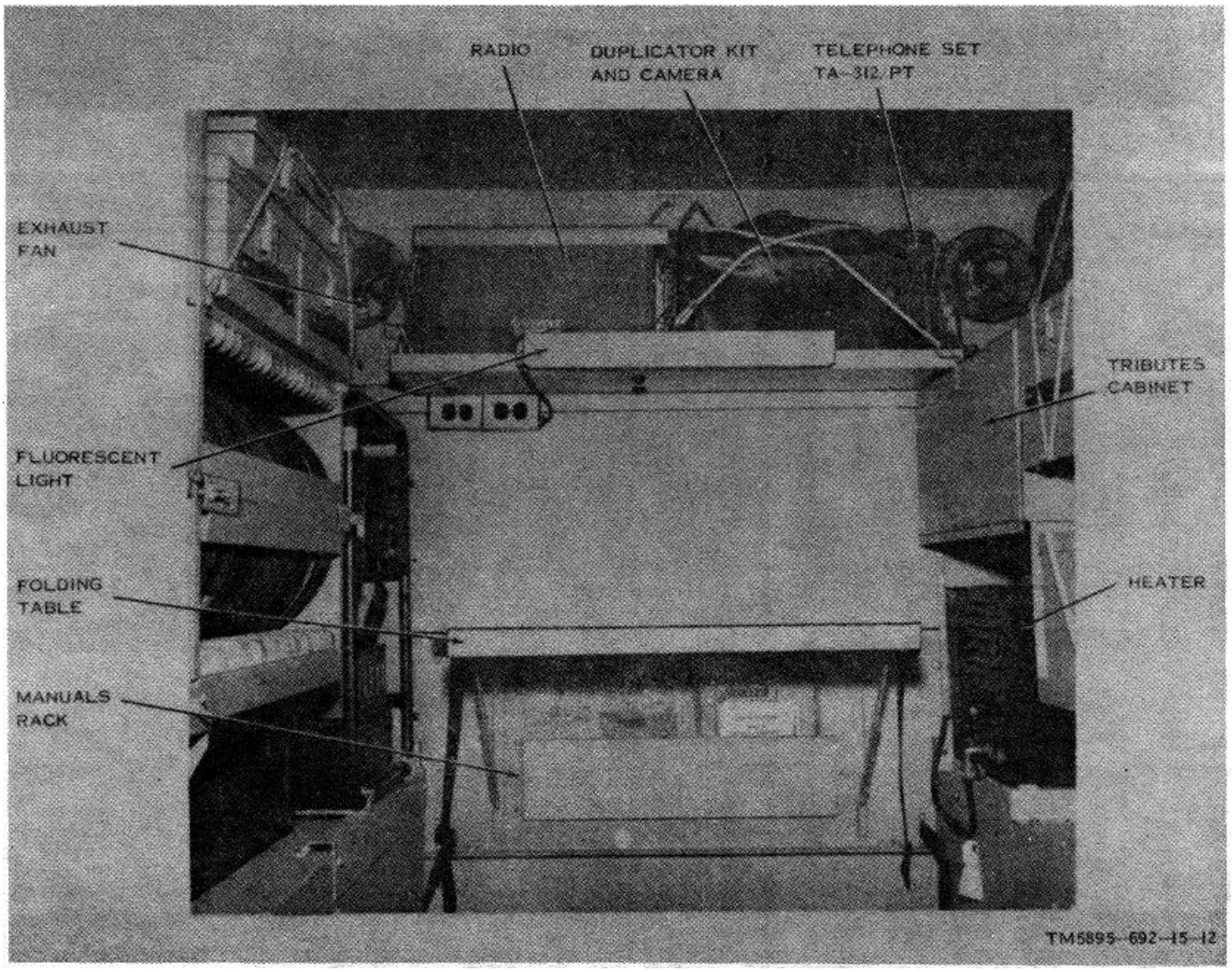


Figure 1-8. Inside shelter, front wall area.

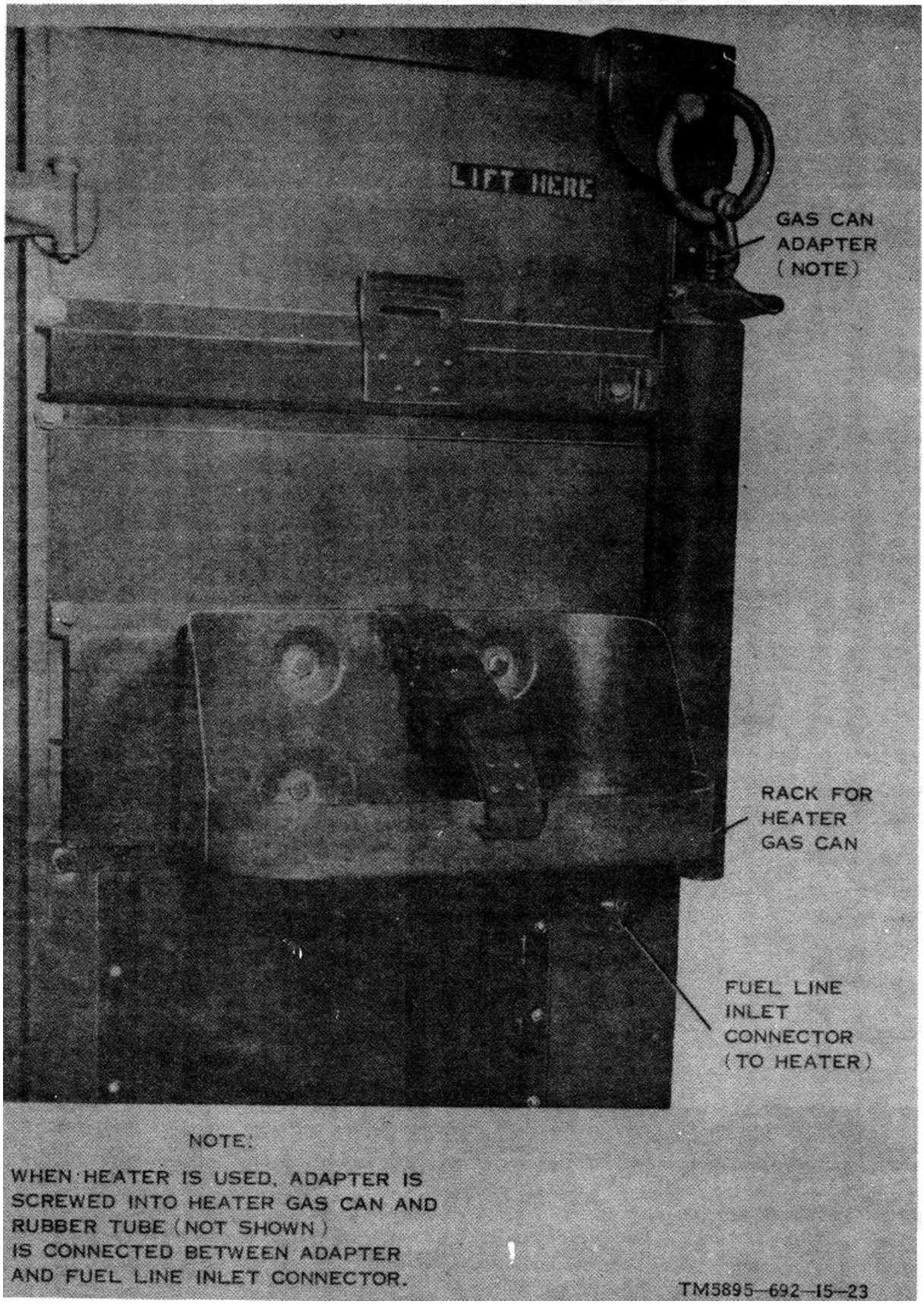


Figure 1-9. Heater gas can rack and gas can adapter.

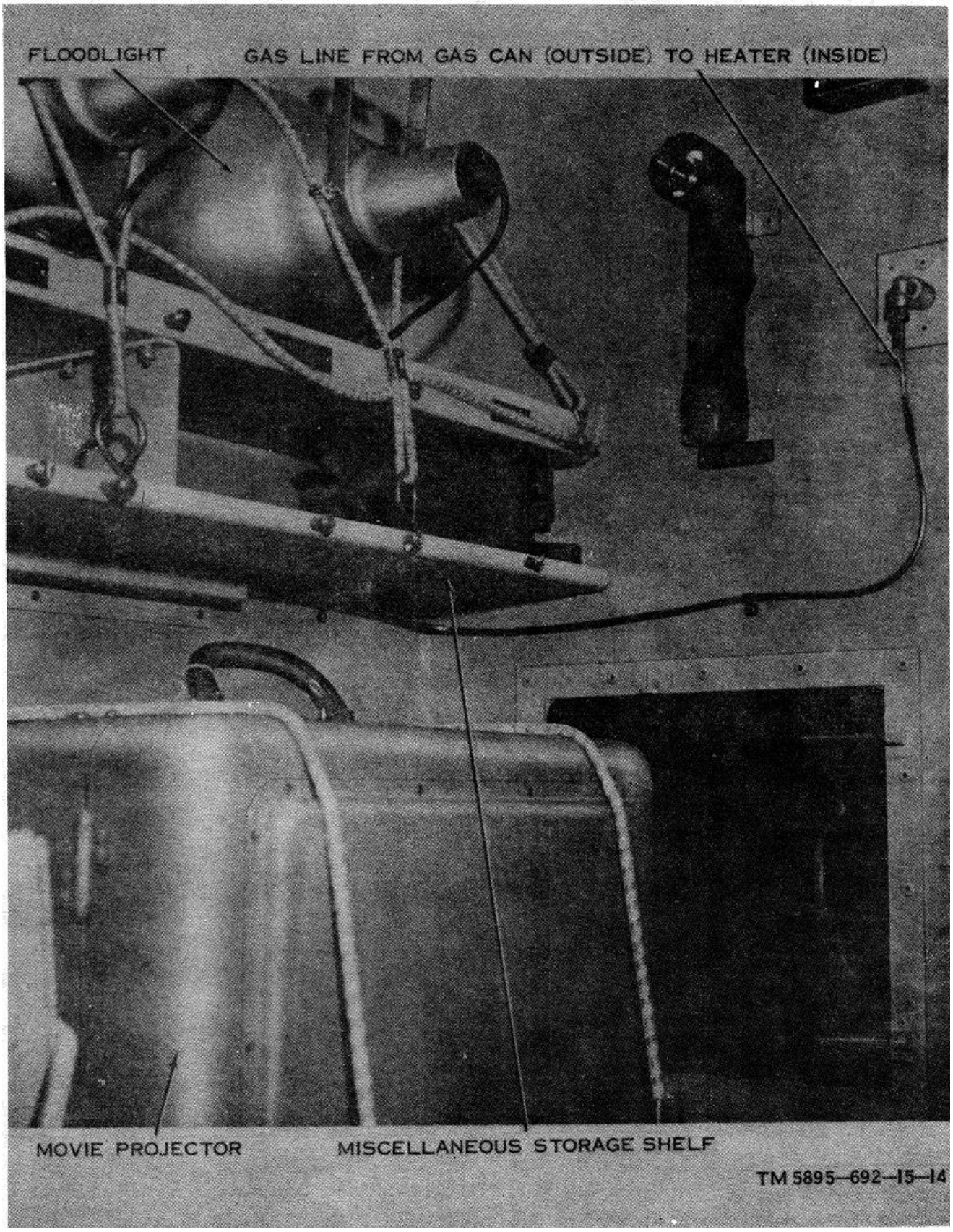


Figure 1-10. Inside shelter, movie project area

CHAPTER 2
UNCRATING AND UNPACKING

2-1. General

a. When packed for shipment, the components of the audio-visual unit are packaged in two sections. One section consists of the crated Shelter, Electrical Equipment S-318/G (Modified), which contains the audio and visual aid components and some accessory items; the other section consists of Truck, Cargo, 3/4-Ton, M-37B1, including a winch. Packed on the truck bed are:

(1) A spare tire, mounted on its rim.

(2) Generator set, Gasoline, 3-Kw, Ac, 60 cycle.

(3) Three gas cans.

(4) A Storage rack to hold the three gas cans.

(5) Crated spare parts for the equipment in the shelter.

b. In addition to the items listed in the basic issue items list (BIIL) (app B), the items listed below are stored in the shelter:

(1) One 2- by 4-inch board, 43 inches long, which is to be bolted to the front of the shelter to allow clearance between the back of the truck cab and the shelter.

(2) External loudspeaker mount, with the loudspeaker and its mast for mounting on the front of the shelter.

(3) Rack for storing one gas can (the heater gas can).

(4) Antenna mast bracket for Mast AB-15/GR.

(5) Lifting boom, with block and tackle pulley assembly, for lifting the power unit.

2-2. Removal of Equipment from Crate

Warning:

The steel bands around the packing crates have been fastened under heavy tension. When cutting the straps, be very careful that the straps do not whiplash and injure personnel in the area where the uncrating is being performed.

a. Uncrate the shelter by removing the steel straps around the packing container.

Caution:

Be very careful when uncrating, unpacking, and handling all of the equipment; brackets, rings, and protruding items, such as the external small screen chute, may be broken. Be sure that all precautions are taken to prevent unwanted movement of the shelter and the truck; the shelter, because of its narrow base and wide top, has a high center of gravity and may tip over. Block the wheels of the truck to prevent unwanted movement. If the equipment becomes damaged during unpacking, a complete overhaul may be required, or the equipment may become useless.

b. Remove the nails with a nailpuller. After removing the nails, remove the top and four sides of the packing case around the shelter. Do not pry deeply into the case; the equipment may become damaged.

c. Remove the packing from all items. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3*b*).

d. Check to see that the equipment is complete as listed on the packing list. Refer to the appropriate technical manual for the equipment; refer also to paragraph 1-7*a* for information on items that are not exactly the same as described in the appropriate technical manual.

e. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate notations concerning the modification have been entered in the equipment manual.

f. Install the following items on the outside of the shelter:

(1) *Heater items (fig. 1-9).*

(*a*) Install the bracket for the heater gas can.

(*b*) Install the tube for the gas can adapter.

(*c*) Connect the gas can adapter to the fuel line inlet connector.

(*d*) Tie the gas can in the bracket.

(2) *Lifting boom (fig. 1-2).* Install the lifting boom in its brackets at the rear of the shelter.

(3) *Loudspeaker mount (fig. 1-3).* Install the loudspeaker mount as follows:

(*a*) Mount the plate attached to the loudspeaker mount to the predrilled holes across the middle of the front of the shelter.

(*b*) Install the U-frame of the loudspeaker mounting shaft (fig. 1-1) and slide the mounting shaft down into the loudspeaker mount. Lock the shaft in place.

(*c*) At this point, the loudspeaker unit from the PA set can be installed in the U-frame (fig. 1-1).

(4) *Board.* Among the equipment in the shelter should be a 2- by 4-inch board, 43 inches long, with predrilled holes. Install this board at the bottom of the front of the shelter (fig. 3-1) with the prepositioned bolts, nuts, and washers.

(5) *Antenna bracket.* Install the antenna bracket in the predrilled holes next to the loudspeaker mount (fig. 1-1). Install the AB-15/GR in the antenna bracket.

(6) *Spare tire.* Mount the truck spare tire on the right door of the truck cab.

g. After the equipment has been unpacked, make the following checks:

(1) Check to see that all clamping devices that hold the components on the shelves of the shelter are securely tightened.

(2) Check to see that required publications are available (app A).

(3) Check to see that fuses of the proper values are in place in the shelter and in the equipment.

(4) Check to see that the batteries for the PA set, tape recorder, radio, telephone, and flashlight are on hand.

(5) Check the cabling of the components (figs. 3-8 and 5-2).

CHAPTER 3
PREDEPARTURE CHECKS AND INSTALLATION

Section I. PREDEPARTURE PROCEDURES

3-1. Sitting

The best site for each use of the audio-visual unit will depend on the local terrain, type of program to be presented (visual and audio, or audio only), and security considerations. Whenever possible, select a site that is level, firm, and dry. If the power unit is to be used for power, select a site for the power unit that is approximately 135 feet from the shelter (in a direction away from the audience to minimize noise interference and fire hazard).

3-2. Predeparture Checks

a. Supplies. Check the supplies listed below; if they are insufficient for the assigned mission, replenish them.

(1) Gasoline supply (includes gas cans and fuel tanks of the power unit and the truck).

(*a*) At the full rated output of the generator set on the power unit, the power unit consumes 0.85 gallons of gasoline per hour; however, with the full-rated load of the shelter (approximately 1,530 watts), the power unit consumes 0.64 gallons of gasoline per hour.

(*b*) The heater consumes approximately 0.2 gallons of gasoline per hour of continuous operation (5 hours of operation per gallon).

(2) Photographic supplies.

(3) Duplicator kit supplies.

(4) Recording magnetic tape supply.

(5) Slide projector slides and camera rolls.

(6) Movie film.

(7) Batteries for the radio flashlight, telephone and tape recorder.

(8) Running spares for all components.

(9) Ammunition and food (if applicable).

(10) Tributes (if applicable).

b. Equipment Operation Checks. Refer to the appropriate technical manual and perform the operation checks listed below which are applicable to the assigned mission.

(1) Power unit (remove and replace as described in para 3-5).

(2) Radio.

(3) Tape recorder.

(4) PA set.

(5) Movie projector.

(6) Slide projector.

(7) Truck.

3-3. Preparation for Transport to Operating site

To prevent loss or pilferage, put all the loose items inside the shelter and lock all of the shelter openings. Use the procedures given in the chart below to check items of the audio-visual unit.

Item	Checks
Shelter	a. If removed from truck, install shelter on truck (para 3-4). b. Perform predeparture checks relating to supplies (para 3-2*a*), and equipment operation checks (para 3-2*b*).
Inventory of equipment	Refer to basic issue items list (app B).
	Inside shelter
Decontaminating Apparatus.	Clamped in place.
Small screen	Inclosed in carrying case. b. Carrying case lashed in place on shelf. c. Small screen chute cover clamped to chute on outside of shelter. Locking bar for chute cover tied securely inside shelter.
Loudspeakers (fig. 1-5).	Tied down to shelf.
Slide projector	a. Mounting bolts not loose. b. Canvas cover on unit c. Slide projector shelter opening locked. d. Spares in box; box locked and tied to shelf.
Part of large screen (below slide projector).	Locked in case; case locked in place on shelf.
Sledge hammer	Clamped in place.
Spare parts boxes	Filled with required items; boxes tied to shelves.

Item	Checks
Movie film reels	Case for each reel closed tightly; cases locked into shelf.
Battery charger	Clamped to shelf.
Amplifier rack	a. Clamped down tightly. b. Remote control unit and microphone in place
	Note. **The bracket with the thumbscrews for mounting the remote control unit should be stowed in a shelter drawer.**
	c. All cables are stowed properly. d Battery cover tightened down.
Floodlights	Tied to shelf.
Radio	a. Covered and tied to shelf. b. Batteries available and fresh, if radio is to be used where ac power is not available
Duplicator kit	Covered and tied to shelf.
Camera	Covered and tied to shelf. Sufficient film is on hand.
Telephone	a. Tied to shelf. b. Batteries available and fresh.
	Caution: **Stow batteries in a shelter drawer until telephone is to be used.**
Tributes cabinet	Locked.
Polaroid film box	Locked and tied to shelf.
Cable storage box	Locked and tied to shelf.
Tape recorder	Closed up and tied to shelf.
Typewriter	Closed up and tied to shelf.
Flashlight	a. Hanging up in its holder. b. Batteries available and fresh.
Movie projector	a. Mounting bolts not loose. b. Case closed and locked. c. Canvas cover on unit. d. Movie projector shelter opening locked.
Part of large screen (below movie projector).	Locked in case and locked to shelf.
Fire extinguisher	Clamped in place. b. At least three-fourths charged.
Folding table and chairs	Tied in place against wall.
Power unit	a. Clamped in place at front of shelter. b. Covered with canvas cover.
Power cable reels and power cables.	Cables cleaned, tied to reels; reels clamped in place.
Switches	a. Equipment power switches: OFF. b. Lighting switches: OFF c. POWER DISTRIBUTION PANEL switches: OFF.
	Outside shelter
Exhaust fans	Covers closed and locked.

Item	Checks
Loudspeaker unit (FIG. 1-1).	a. Lowered into loudspeaker mount and locked in position. b. Audio cable wire wrapped around loudspeaker unit (or put inside shelter, if desired, to prevent pilferage). c. Mounting bolts not loose. d Canvas cover closed on loudspeaker unit.
Radio antenna	Antenna sections removed and stowed in shelter. b. Antenna bracket bolts not loose. c. Antenna lead-in wire connected to AB15/GR, if desired.
Truck power cable	Disconnected from dc control panel in shelter and coiled up in truck cab; other end of cable is still connected to truck battery.
Shelter tiedown cables	Turnbuckles properly tightened.
Roof access steps	Pushed back to vertical position.
Heater exhaust port	Cover closed.
Sun tarpulin brackets	Clamped into clip retainers.
Power entrance box	Connectors closed.
Heater gas can	Tied to heater gas can rack. Gas can cover closed.
Heater gas can adapter	Connected to fuel line (or disconnected and stowed (with rubber tube) in shelter to prevent pilferage).
Truck tailgate	Secured.
Gas can rack	a. Mounting bolts not loose. b. Three gas cans tied to gas can rack. Gas can covers closed.
Truck pioneer tools	Tied to pioneer tools rack on gas can
Rear door	a. Closed and locked. b. Air filter closed and clamped.
Lifting boom	Clamps to rear of shelter.

3-4. Lifting Shelter

Caution:

The plane or helicopter, and the lifting device must be capable of lifting 2,170 pounds.

The shelter may be airlifted to the site assigned to the mission or it may be removed from, or placed on, the truck. When the shelter is to be airlifted to another site, perform the checks listed in paragraph 3-2 to prepare the shelter for transport and use at the new site. Use the procedures given in a and c below as appropriate.

a. When the shelter is to be removed from, or mounted on the truck, perform the operations before lifting the shelter (*c* below).

(1) Secure all the exterior wall covers, the sun tarpaulin brackets, and the lifting boom.

(2) Make sure that all items in the shelter are fastened securely in place on the shelves and on the floor.

(3) Disconnect the antenna mast sections from the AB-15/GR.

(4) Push the rear access steps to a vertical position.

(5) Remove the gas can rack at the rear of the shelter.

(6) Close the shelter doors.

(7) When the shelter is to be removed from the truck, loosen the turnbuckles and unhook the sling assemblies from the bracket on the truck fender (fig. 3-2).

(8) Check to see that the 2- by 4-inch board is mounted at the bottom of the front of the shelter (fig. 3-1).

b. When the shelter is to be lifted onto the truck, perform the procedures given in (1) and (2) below before lifting the shelter (c below).

(1) Perform the shelter securing operations (a above).

(2) Perform the following operations on the truck:

(*a*) Lower the tailgate.

(*b*) Clear the truck bed of all material and dirt.

(*c*) If the equipment listed below is on the truck, remove it:

1. Bows.
2. Two seat assemblies.
3. Tarpaulin.

Note.

The truck assigned to the AN/MSQ-85 has had the pioneer tools rack removed from the tailgate. If the truck being used has the pioneer tools rack in the tailgate, remove the rack to allow the gas can rack to be bolted to the shelter after the shelter is mounted in the truck bed. The pioneer tools rack is part of the gas can rack.

c. Lift the shelter as follows:

(1) Perform the operations given in a or b above as applicable.

(2) Secure one sling assembly to each lifting and tiedown eye at the corners of the shelter, as shown in figure 3-1.

Caution:
Note
that the turnbuckle end of the sling assembly is attached to the lifting ring.

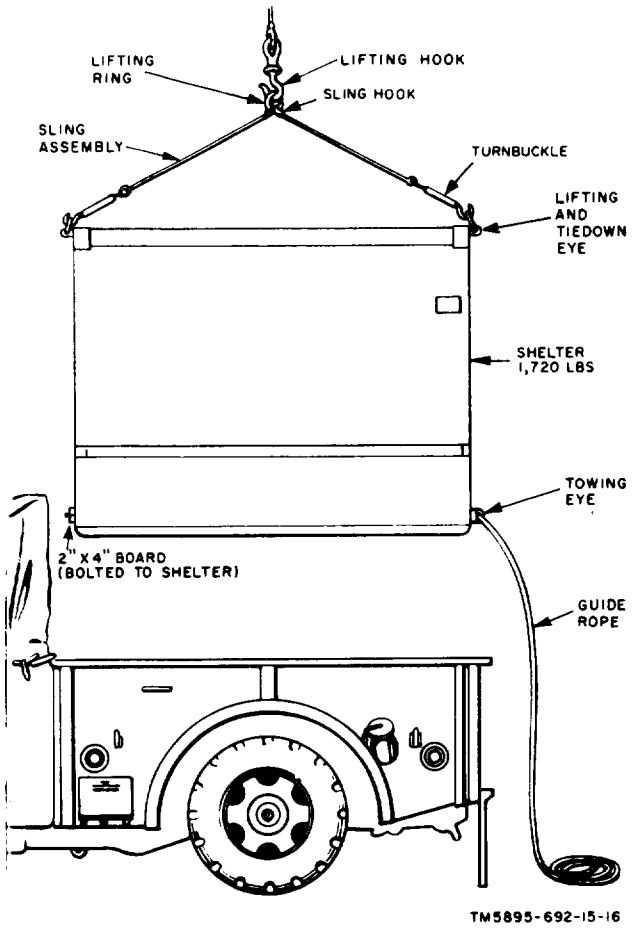


Figure 3-1. Lifting shelter from truck, or loading shelter into trek.

(3) Put the lifting ring into the sling hooks and put the hook of the lifting device in the lifting ring.

(4) Tie a guide rope (1/2-inch rope, at least 15 feet long) to one rear towing eye of the shelter. Position a man at the guide rope, and operate the lifting device to lift the shelter. Lift the shelter carefully; guide it carefully to avoid damage to the loudspeaker mount and the shelter.

(5) While the shelter is being put into the truck bed, make sure that the wood spacer on the front of the shelter base is snug at the front of the truck bed.

d. After the shelter has been lifted onto the truck (*c* above), perform the following operations:

(1) Unhook the four sling assemblies from the shelter and the lifting ring.

Caution:

Note that the turnbuckle end of the sling assembly is attached to the sling assembly bracket on the truck fender.

(2) Use two sling assemblies at each side of the shelter and secure the shelter to the brackets on the truck fender, as shown in figure 3-2.

Caution:

Do not turn the turnbuckles excessively.

(3) Manually tighten the four turnbuckles as tightly as possible; then, use an appropriate tool to turn each turnbuckle an *additional one-half turn*.

(4) Put up the tailgate.

(5) Bolt the gas can rack to the back of the shelter.

(6) Install the truck pioneer tools in the pioneer tools rack.

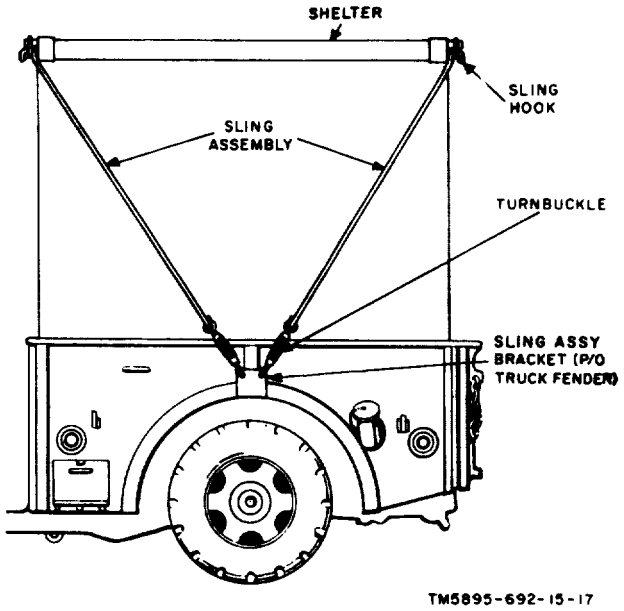


Figure 3-2. Shelter secured to truck

Section II. POWER UNIT INSTALLATION AND POWER CONNECTIONS

3-5. Installation of Power Unit

a. Removal of Power Unit from Shelter. If the shelter is mounted on the truck, drive the truck to the site selected for the power unit.

(1) Remove the gas cans and the gas can rack at the rear of the shelter.

(2) Remove any items in front of the power unit.

(3) Unclamp the power unit (fig. 3-3) and set the clamps to the side so that they are not in the way when the power unit is pulled to the shelter door.

(4) Remove the gun rack from the bottom of the shelter door (fig. 3-5). Put the thumbscrews that held the gun rack back in their receptacles in the door so that they will not be lost.

(5) Remove the power unit from the shelter as follows:

Caution:

DO NOT MOVE THE POWER UNIT OVER THE DOOR SILL.

(*a*) Slide the power unit to the door sill.

Caution:

Be sure that all ropes are free in the block and tackle.

(*b*) Hang the upper block (the end with the pulling rope) of the block and tackle into the eye on the end of the lifting boom (fig. 3-6). Insert the hook of the lower block of the block and tackle into the eye (hole) of the power unit lifting bracket (fig. 3-4). Station one man on the ground outside the shelter to guide the power unit as it is moved from the shelter.

Warning:

Be extremely careful when lifting and moving the power unit. The power unit weighs approximately 275 pounds; if it is not under control, serious injury to personnel or damage to other equipment may result.

(*c*) Use the block and tackle to raise the power unit several inches from the shelter floor.

(*d*) Carefully swing the boom until the power unit is out of the shelter. Lower the power unit to the ground and remove the block and tackle.

(*e*) Replace the gun rack on the shelter door.

(*f*) Coil up the block and tackle and stow it in the shelter.

(*g*) If the power unit is to be removed, lift it at the four upper corners.

(*h*) Make the required power and grounding connections. (Refer to paragraph 3-6.)

b. Storage of Power Unit In Shelter. To store the power unit in the shelter, perform the removal procedures given in a above in their reverse order.

3-6. Grounding and Power Connections

Warning:

The shelter must be properly grounded (a below) before ac power is connected. Failure to do so can result in severe electrical shock to operating personnel.

a. Ground Connections (fig. 3-7). Remove the ground rod (fig. 3-4) and the sledge hammer (fig. 1-5) from the shelter. Examine the earth near both the shelter and the power unit, and decide which is more moist. Drive the ground rod into the earth as far as it will go at a position within 5 feet of the power unit or the shelter. Use the bonding strap provided for this purpose to connect the ground rod directly to the GROUND terminal in the shelter entrance box or the ground stud on the power unit frame.

b. Ac Power Connections (fig. 3-7). Ac power for the operation and lighting of the equipment in the shelter is normally provided by the power unit. Ac power can also be applied to the shelter from other ac power sources using the power cables provided with the audio-visual unit.

(1) Remove the power cable reel from the shelter. Unwind both cables from the reel and put the reel near the shelter.

(2) At the power unit, connect the cable terminals to the 120-volt, single-phase terminals and to the ground stud as shown in figure 3-7.

(3) If ac power is obtained from a source other than the power unit, make the same connections as would be used for the power unit.

(4) Interconnect the two power cables; and connect the last cable connector to the 115-VAC receptacle on the power entrance box.

(5) After the power cable connections have been made ((1) through (4) above), check to see that the main circuit breakers in the power distribution panel are set to OFF.

(6) Check to see that the power unit is provided with gasoline; then, start the power unit. Refer to TM 5-6115-271-15 for complete operating procedures.

(7) When the power unit is operating satisfactorily, the power switches in the shelter may be turned on and the ac equipment used.

(8) To connect equipment used outside the shelter to the ac power source, extension cables may be connected to the ac convenience outlet next to the 115-V AC receptacle on the power entrance box.

(9) To apply power to the ac convenience outlet, set the EXT LIGHTS switch to ON. The power is also controlled by one of the circuit breakers in the power distribution panel.

c. PA Set Dc Power Distribution (fig. 3-8). The PA set operates only on direct current. The dc power is provided from one of three sources; the nicad battery, the battery charger, or the truck battery.

(1) The cabling between the battery charger and the dc control panel, the dc control panel and the nicad battery, and the nicad battery and the junction box of the PA set is part of the shelter wiring.

(2) When the shelter is mounted on the truck, a power cable is connected between the DC in receptacle on the dc control panel and the truck battery.

(*a*) The 15-foot power cable is run through the cable entrance opening in the shelter wall (fig. 1-6) and the back of the seat in the truck cab to the truck battery.

(*b*) Firmly attach the power cable to the truck battery terminal as follows:

1. Connect the white-colored cable wire to the positive battery terminal.

2. Connect the black-colored cable wire to the negative battery terminal.

Note.

The positive battery terminal is marked with a plus (+) and is larger in diameter than the negative battery terminal which is marked with a minus (-). Also, the negative battery terminal is connected to the truck chassis with a heavy bonding strap.

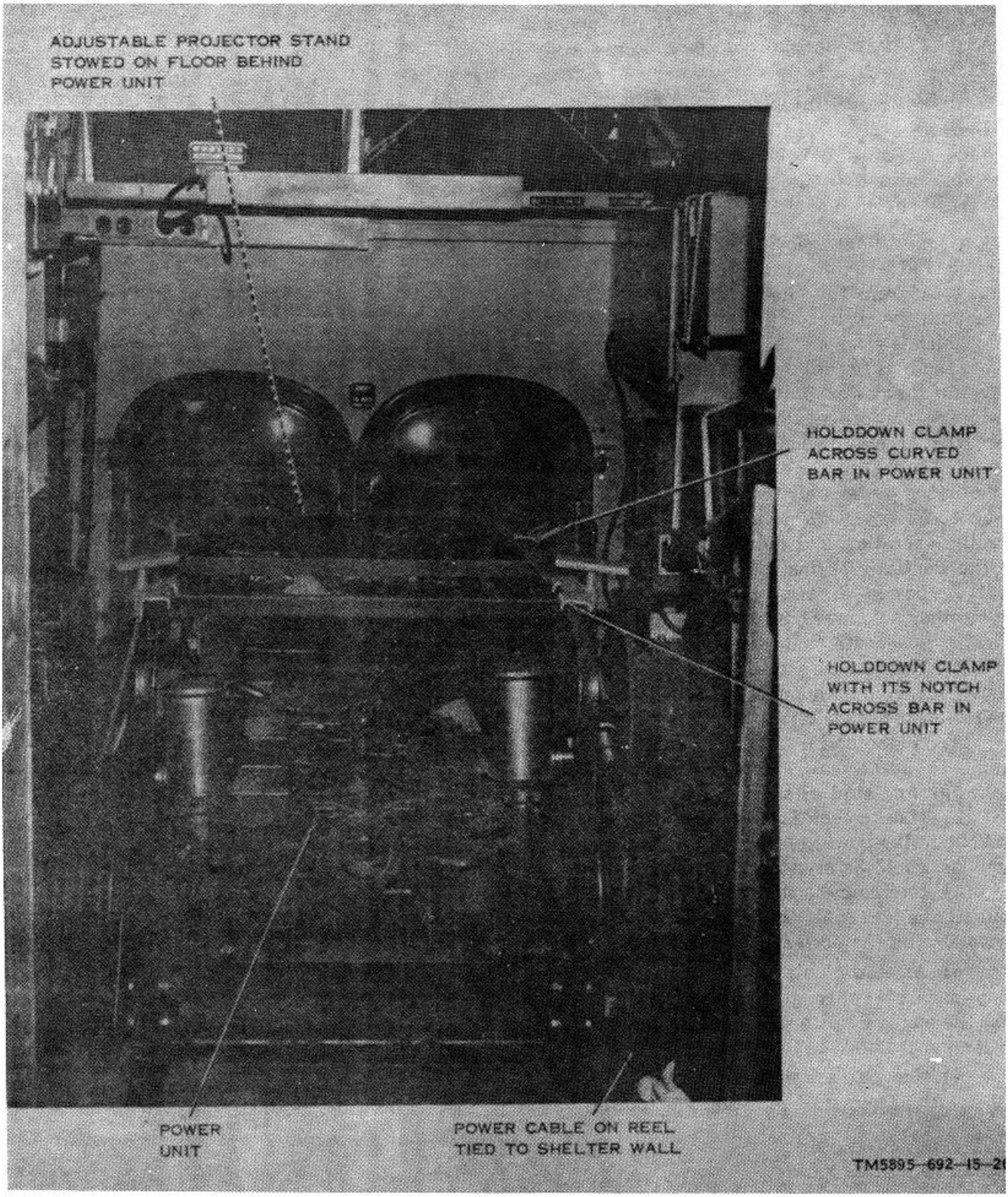


Figure 3-3. Power unit on floor of shelter.

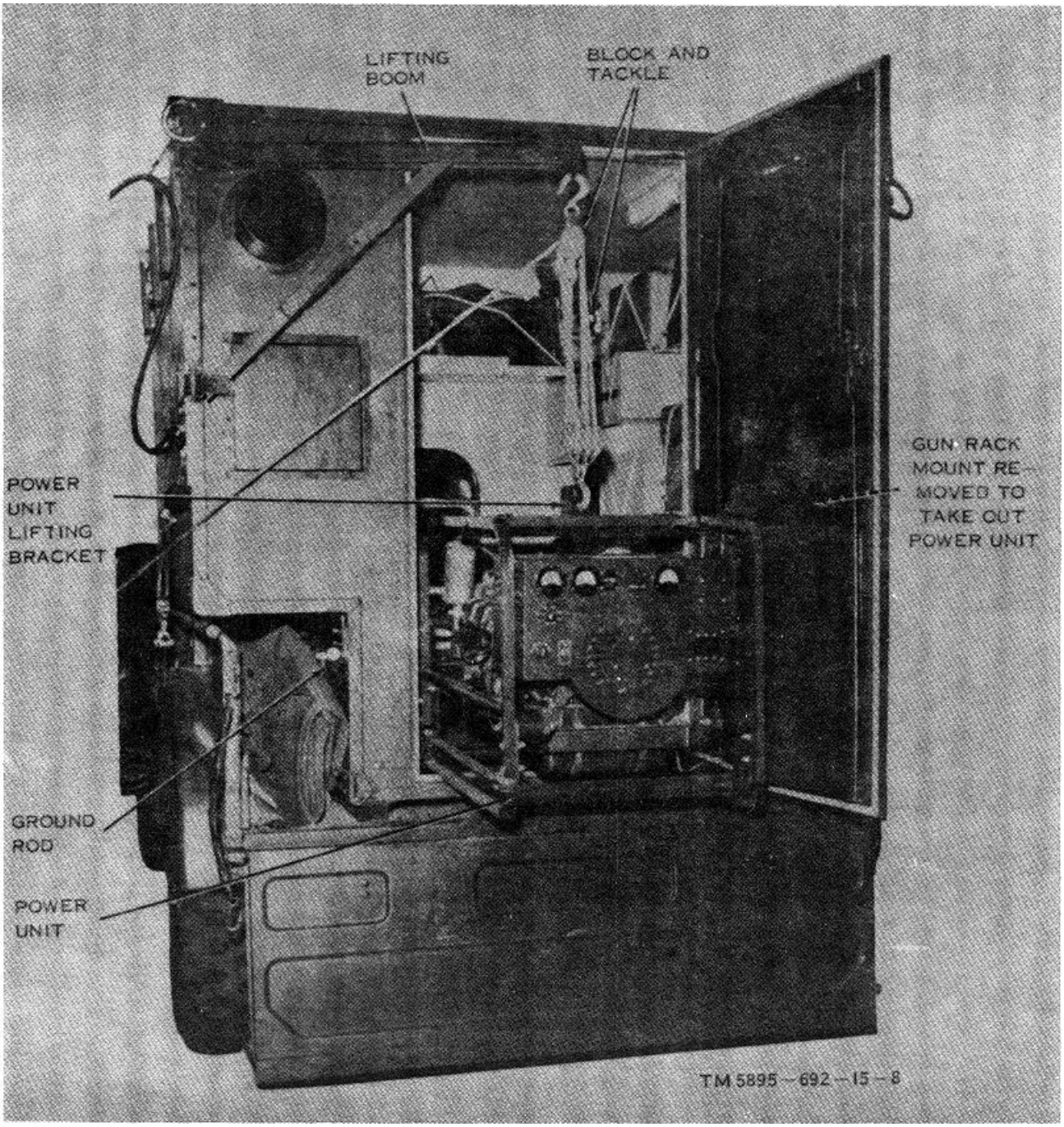


Figure 3-4. Using block and tackle to lift power unit.

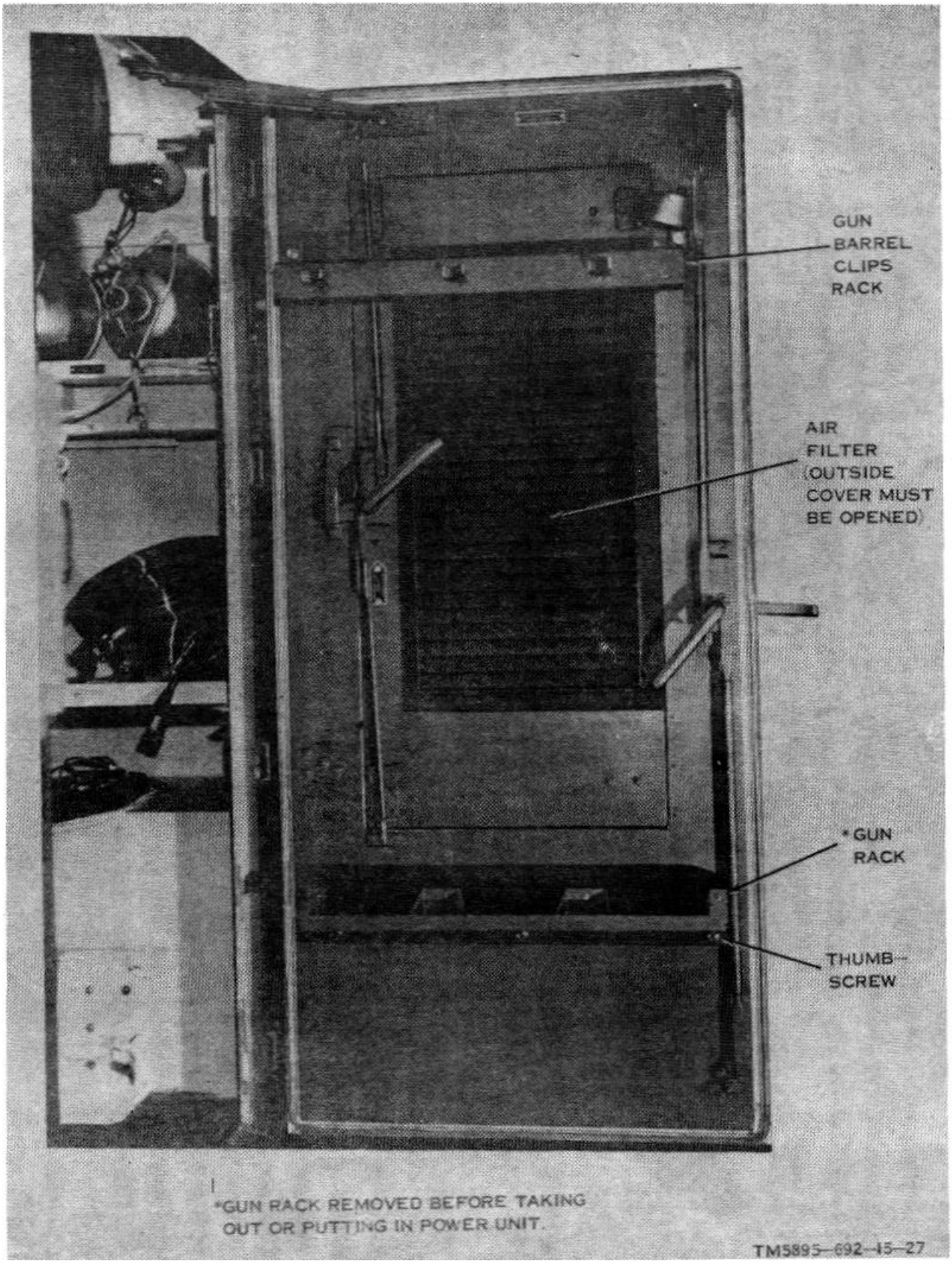


Figure 3-5. Inside of rear door of shelter.

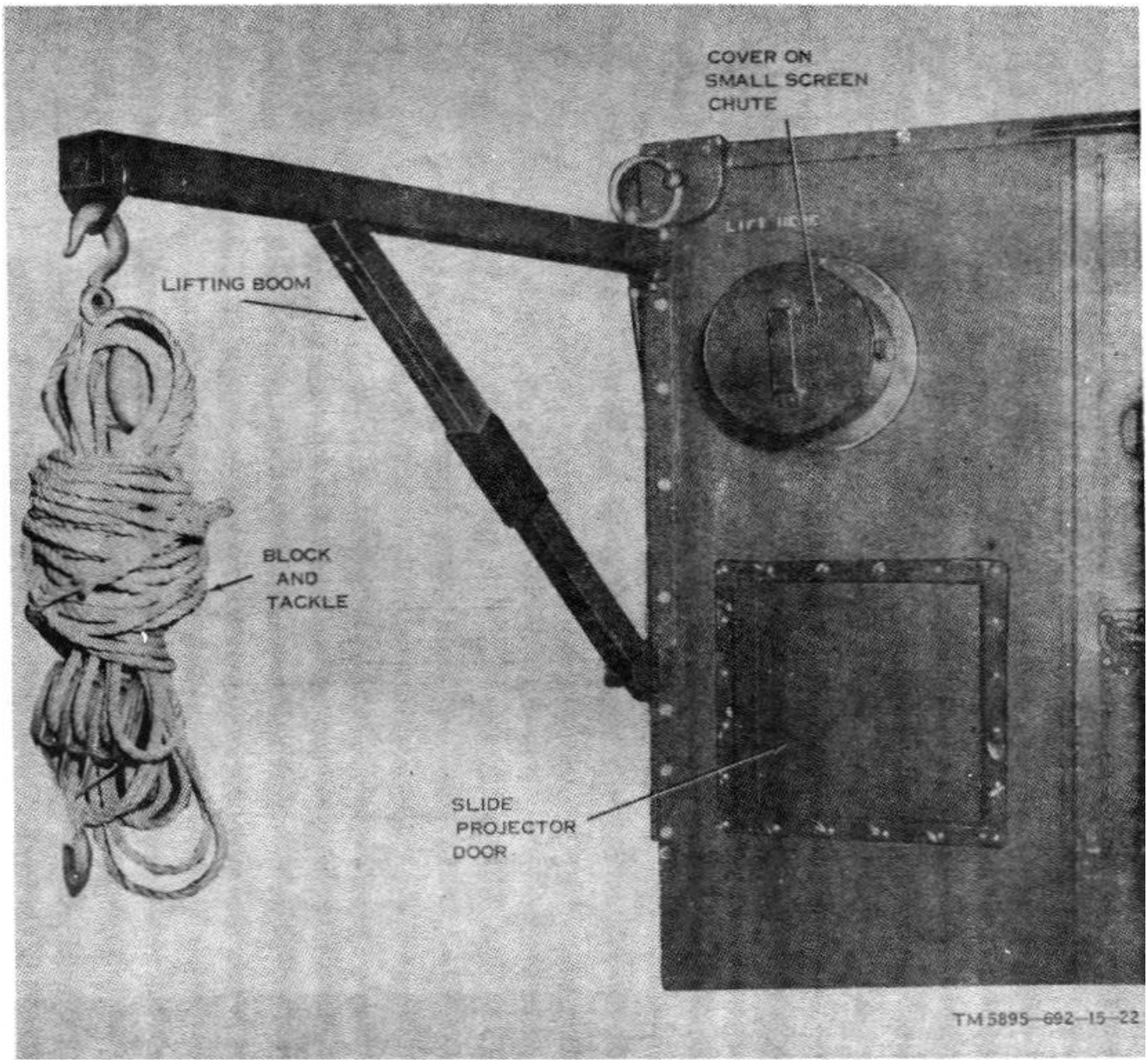


Figure 3-6. Lifting boom and block and tackle.

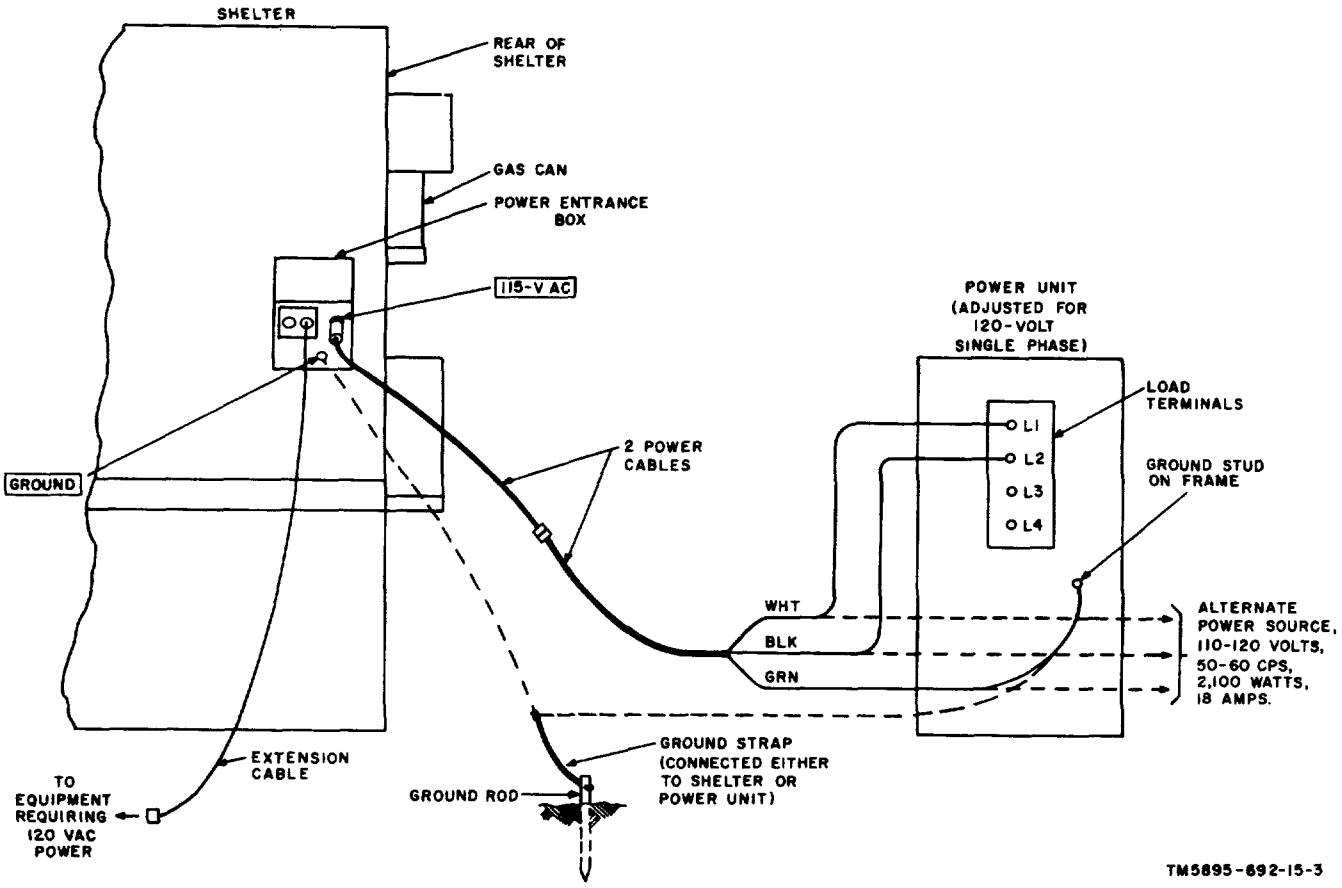
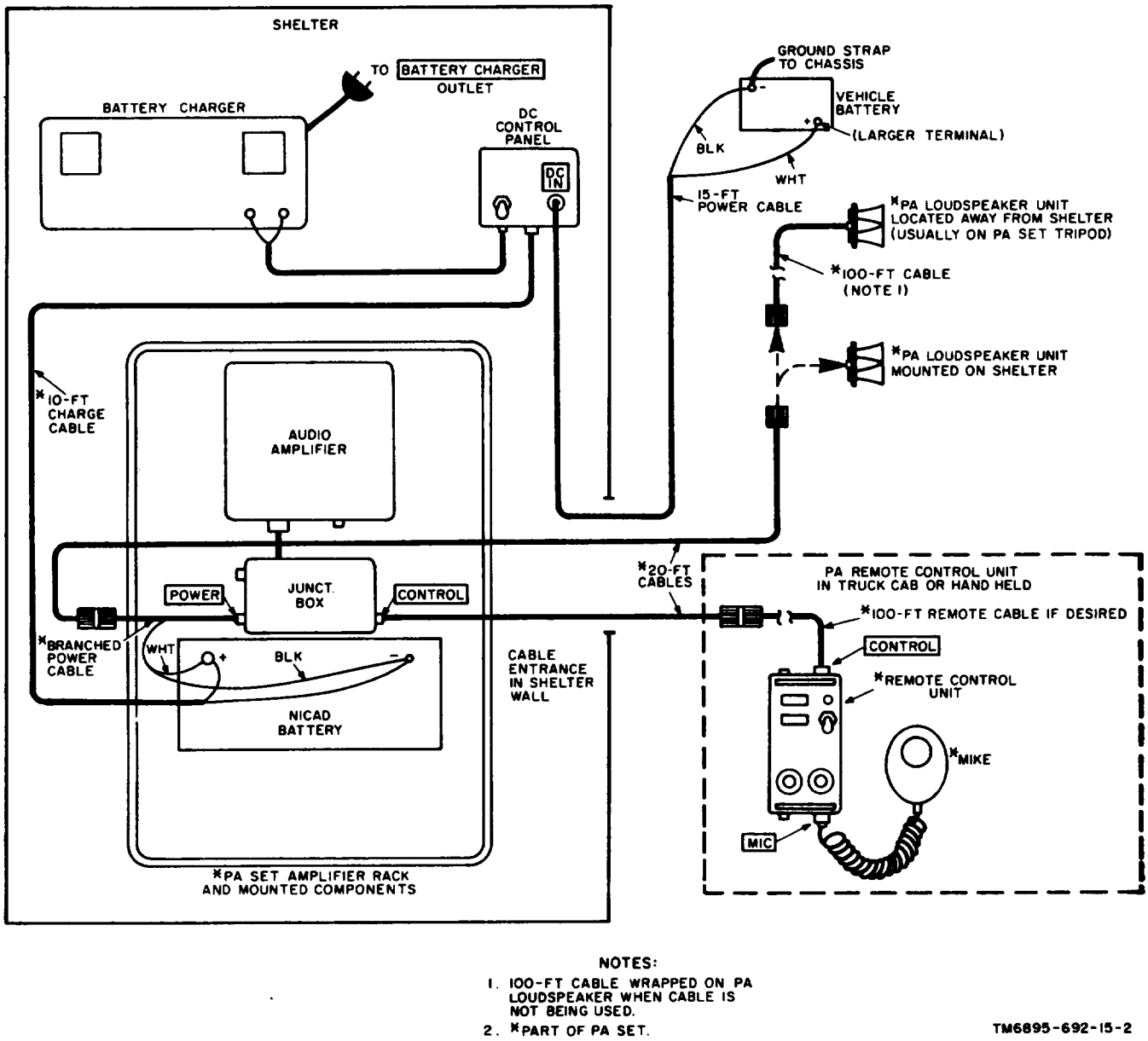


Figure 3-7. Grounding and ac power cable connection to power unit and shelter.



NOTES:
1. 100-FT CABLE WRAPPED ON PA LOUDSPEAKER WHEN CABLE IS NOT BEING USED.
2. *PART OF PA SET.

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Figure 3-8. PA set, cabling diagram.

Section III. LARGE SCREEN, ASSEMBLY, ERECTION AND DISASSEMBLY

3-7. Screen, Projection BM-22A and BM-22A Kit

a. General. The BM-22A parts are contained in two large screen cases stowed on the shelves in the shelter (figs. 1-4 and 1-7). The BM-22A (fig. 3-9) includes a luminescent projection screen, a framework, two leg assemblies, four long guy ropes (27 ft), four short guy ropes (10 ft), and eight stakes. To strengthen the BM-22A, a kit is provided. The BM-22A kit (fig. 3-9) includes a canvas bag with items packed in it (fig. 3-10) and a canvas roll with four corner braces (fig. 3-12). In the canvas bag are five long guy ropes (27 ft), two short guy ropes (10 ft), seven stakes, and four bracing assemblies (which include two guy brackets for mounting on the sides of the BM-22A framework, and two guy brackets for mounting on the top and bottom of the BM-22A framework).

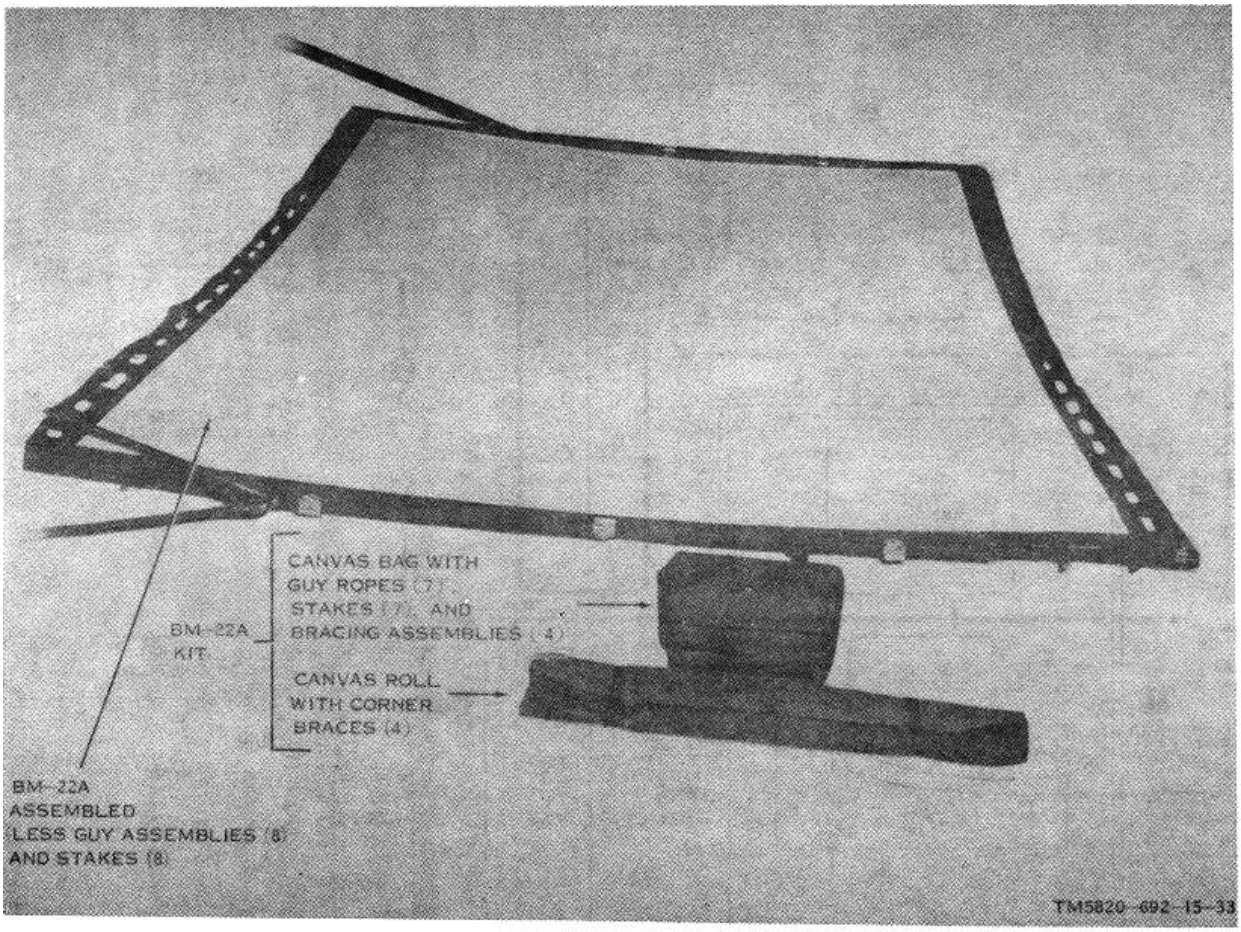


Figure 3-9. Screen, Projection BM-22A and BM-22A kit.

b. General Erection Requirements.

(1) A cleared ground area approximately 20 feet by 30 feet is required.

(2) Drive the guy stakes into the earth so that the hook in the stake faces away from the luminescent screen and the stake is angled approximately 45° into the ground and pointing toward the luminescent screen.

(3) In general, determine the location guy stakes for the top and middle guys before the luminescent screen is connected to the framework. The purpose for siting at least the top and middle guy stakes, *before* the BM-22A is erected with the luminescent screen installed on the framework, is to prevent damage to the sail-like assemblage while locating the positions for the guy stakes. Lay the framework on the ground and install the luminescent screen on the framework. Stand up the framework with the luminescent screen installed, and all the guys installed.

(4) To prevent the framework legs from sinking into the ground, keep on hand two boards that are 2 inches thick, 6- or 8-inches wide, and approximately 5-feet long (fig. 3-18).

3-8. Assembly and Erection of BM-22A

a. BM-22A Framework and BM-22A Kit.

(1) Remove the large screen cases from the shelter (figs. 1-4 and 1-7). Remove the contents of the cases (para 3-7a) and replace the empty cases in the shelter shelves.

Caution:

If it is windy and unsafe to erect the BM-22A with the luminescent screen installed on it, do not install the luminescent screen on the framework at this time. The procedures for raising the BM-22A with the luminescent screen installed on it are given in b below; the procedures for erecting the BM-22A in windy conditions are given in c below.

(2) In a cleared area, approximately 22 feet by 18 feet, assemble the BM-22A framework; use

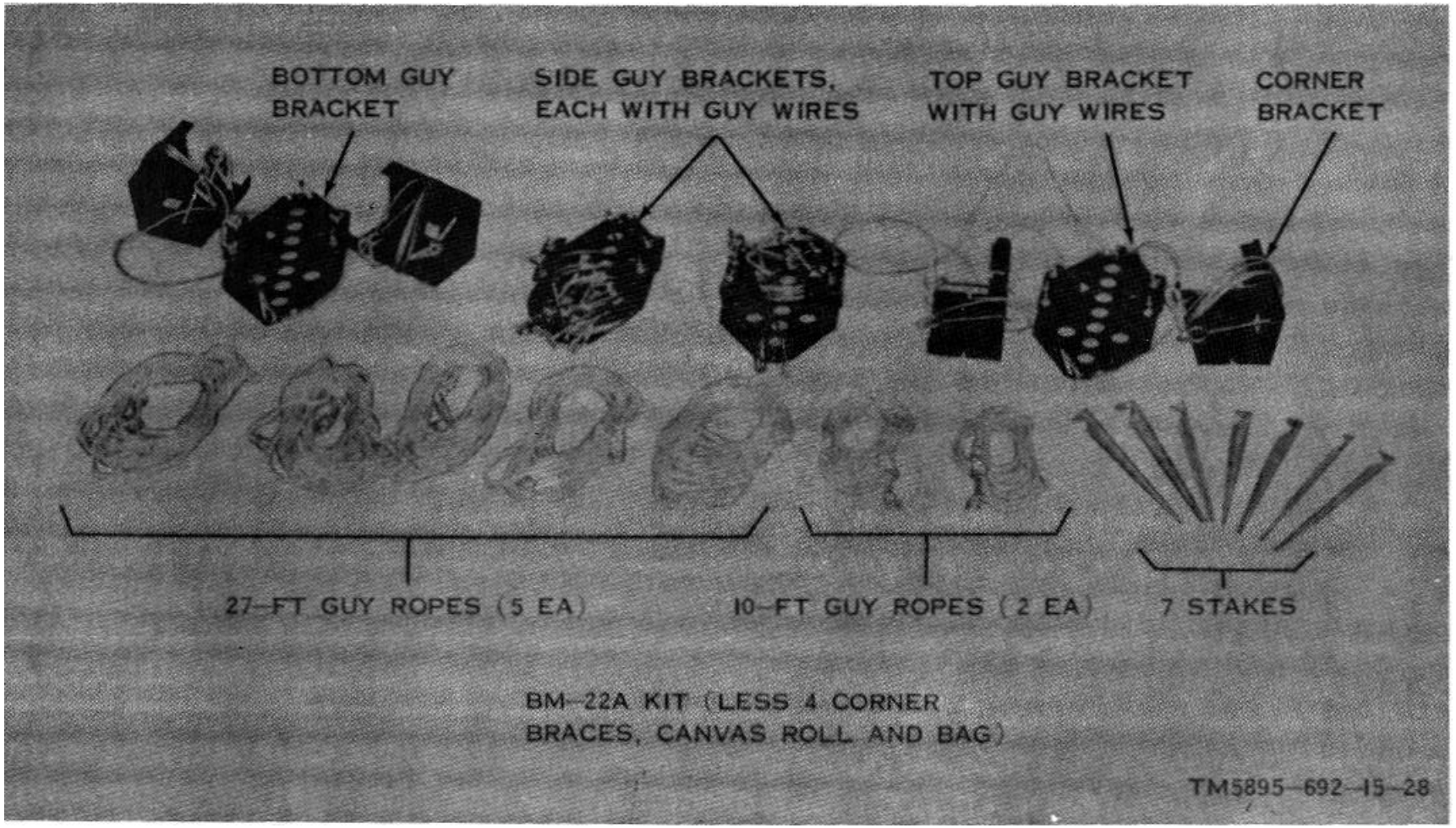


Figure 3-10. Parts of BM-22A kit, less bag and canvas roll with four corner braces.

the procedures given in steps 1 through 8, the assembly instructions, figure 3-11.

(3) Assemble the corner braces from the BM-22A kit. Mount the corner braces at each corner of the BM-22A frame (fig. 3-12).

(4) Install the top and side bracing assemblies from the BM-22A kit (fig. 3-10) on the assembled BM-22A frame as follows:

(*a*) Mount the top and bottom guy brackets in the middle of the BM-22A frame (fig. 3-12).

(*b*) Put the corner brackets at each corner of the BM-22A frame. Tighten the wingnuts at the corner brackets to tension the guy wires equally to the center guy bracket (fig. 3-3).

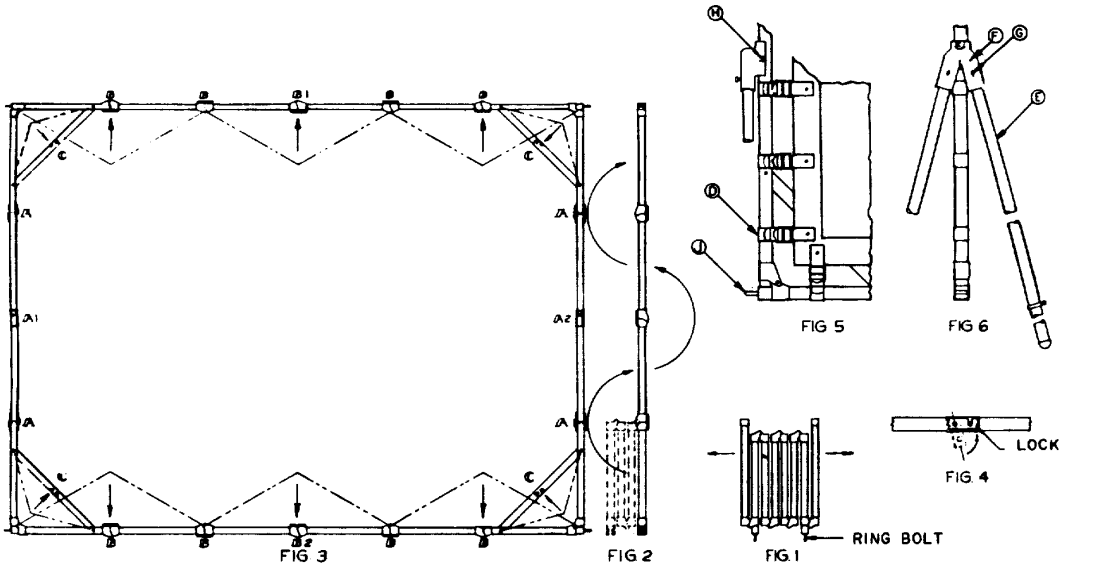
(*c*) Mount the side guy brackets (fig. 3-12) on each side of the BM-22A frame. Tighten the wingnuts at the corner brackets to tension the guy wires equally to the side guy bracket (fig. 3-14).

(*d*) Recheck the tension of each guy wire and adjust the wingnuts as necessary to provide equal tension on all guy wires.

b. Siting for Guy Ropes Under Nonwindy Conditions. Use the procedures given in (1) through (9) below when it is considered safe to erect the BM-22A with the luminescent screen installed on it.

(1) Use a 10-foot guy rope and measure approximately 20 feet from each corner of the BM-22A for the location of the stakes for the top guy ropes, and approximately 25 feet for the location of the stakes for the middle guy ropes. Locate the point for the stakes at approximately 45° from the sides of the BM-22A (A and B, fig. 3-16).

(2) Use a 10-foot guy rope and measure approximately 20 feet at right angles to the rear of the BM-22A (away from the audience) for the location of the guy stake from the top center of the BM-22A (A, fig. 3-17).



NOTE: TWO PERSONS REQUIRED TO ERECT SCREEN

1. PLACE SCREEN FRAME IN POSITION AS SHOWN (FIG. 1).
2. PULL IN DIRECTION INDICATED BY ARROWS.
3. PLACE FRAME ON GROUND AND SWING FRAME IN DIRECTION OF ARROWS AS SHOWN (FIG. 2).
4. TIGHTEN CORNER BRACES (C) AS INDICATED (FIG. 3).
5. LOCK HINGE SECTIONS (FIG. 4) AS FOLLOWS. A1–A2 AND B1–B2.
6. PLACE SCREEN FABRIC INSIDE FRAME, PROJECTION SURFACE UPWARDS.
7. BRING STRAPS (D) AROUND FRAME MEMBERS AND BUCKLE SECURELY BY STARTING AT CORNERS. FOLLOWED BY THE CENTER, AND THEN THE OTHERS.
8. INSERT LEGS (E) INTO LEG BRACKETS (F) IN SUCH A MANNER THAT THUMB SCREWS ENGAGE HOLES IN LEG MEMBERS BEFORE TIGHTENING (G).
9. SNAP GUY-ROPES INTO RING BOLTS (J) AT THE CORNERS OF THE FRAME.
10. SWING FRAME INTO VERTICAL POSITION. HOLDING FRAME SO THAT ONE HAND GRASPS UPPER HALF AND ONE HAND LOWER HALF OF SCREEN.
11. INSERT THE STUDS IN THE LEG BRACKETS INTO THE HOLES PROVIDED IN THE FRAME AND TIGHTEN THUMB SCREWS (H).
12. ADJUST HEIGHT BY USING LEG EXTENSIONS.
13. REVERSE PROCEDURE WHEN TAKING DOWN SCREEN.

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Figure 3-11. Screen, Projection BM-22A, assembly instructions.

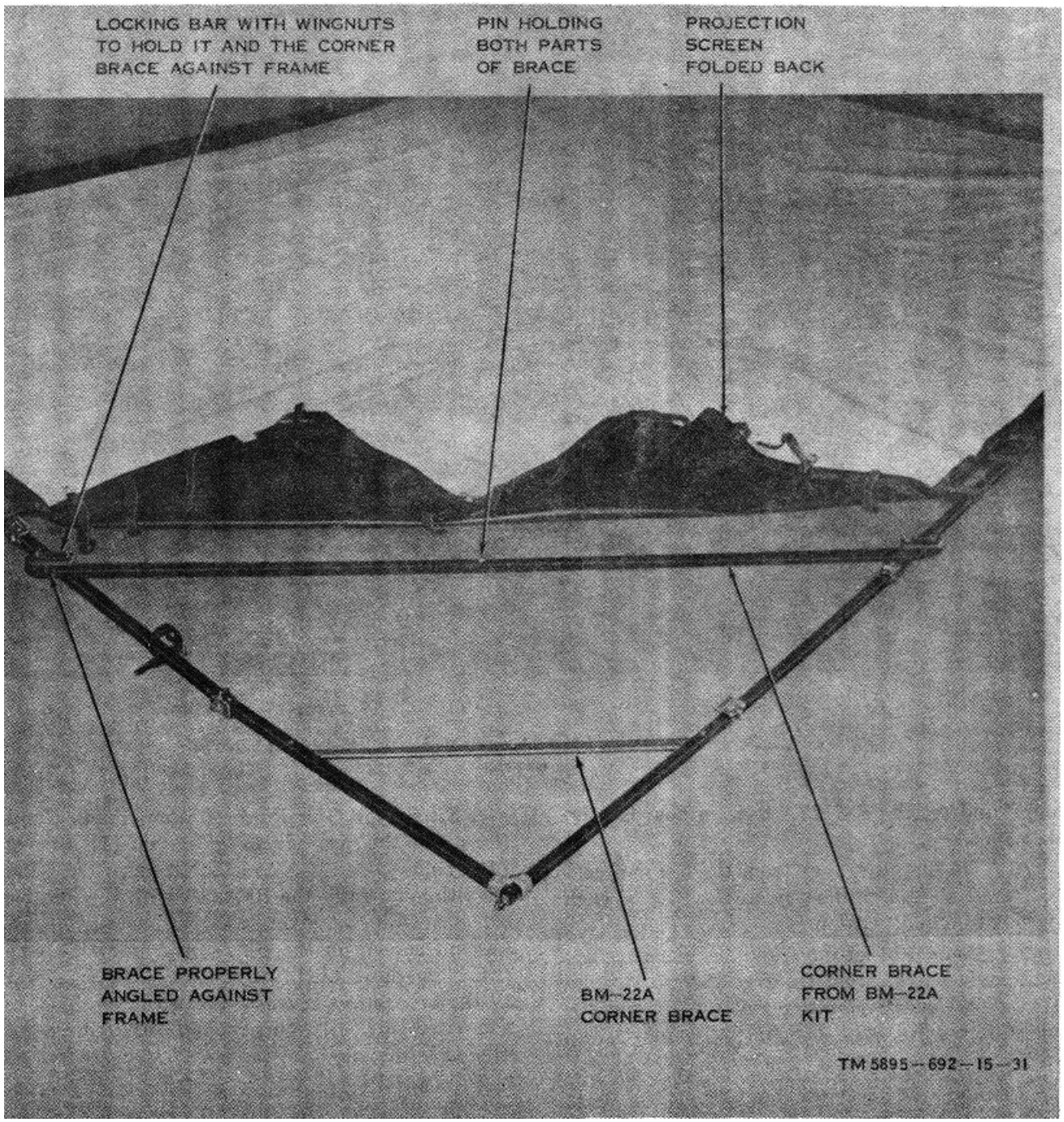


Figure 3-12. Mounting corner brace of BM-22A kit on BM-22A framework.

Caution:

The stake should be driven into the ground at a 45° angle so that the point of the stake is directed toward the BM-22A, and the hook in the stake is facing away from the BM-22A.

(3) At the points determined in (1) and (2) above, drive the guy stakes into the ground with a sledge hammer until the hook in the stake is level with the ground.

(4) Attach the snaphooks of the 27-foot guy ropes to the top ends, top middle (rear of the framework), and the sides of the BM-22A.

(5) Raise the BM-22A framework and set it on its legs. If the ground is soft, level the

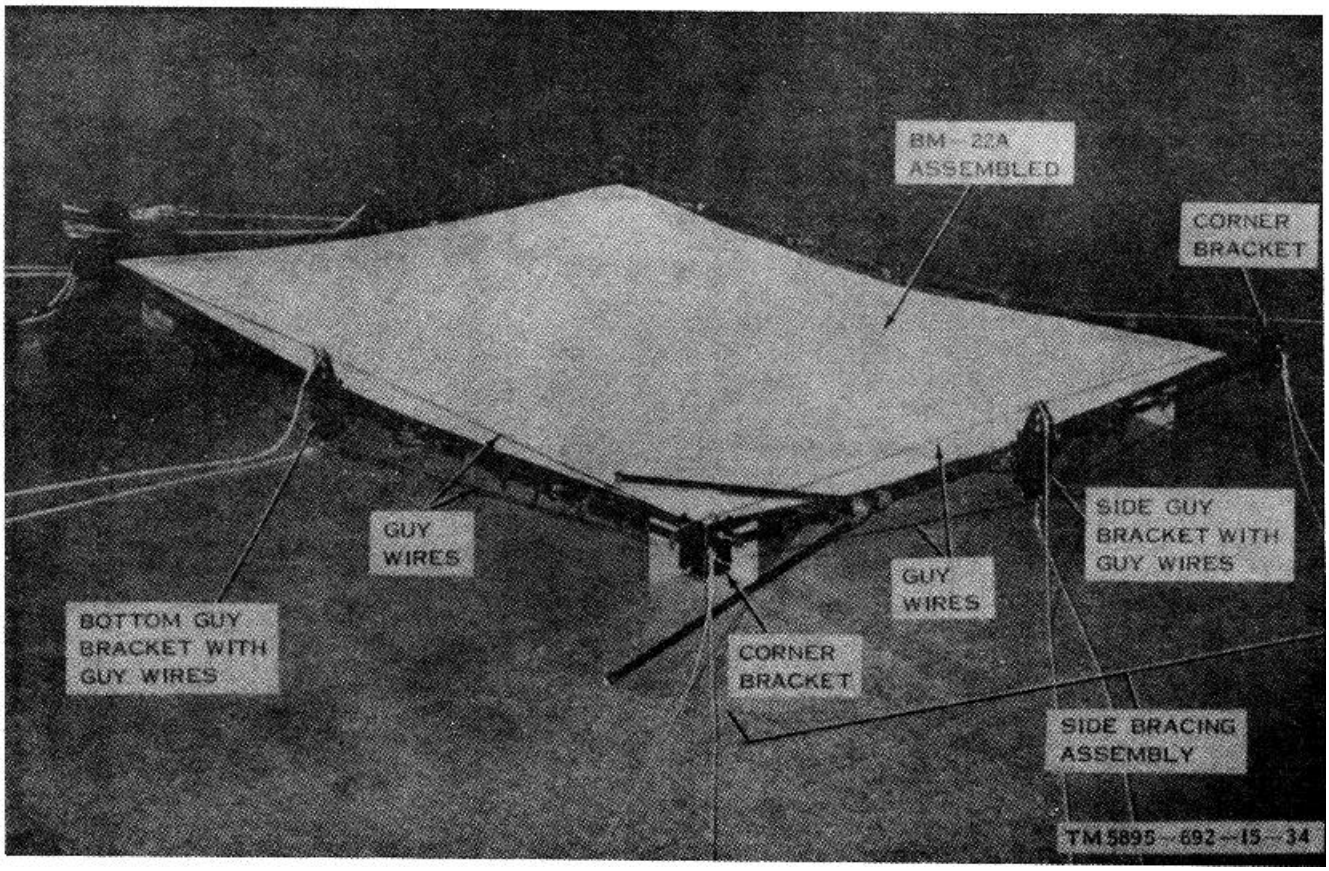


Figure 3-13. Screen, Projection, BM-22A assembled with BM-22A kit mounted on screen.

ground and set the BM-22A legs on boards (fig. 3-18).

(6) Tie the guy ropes from the top and center of the BM-22A to the guy stakes. Adjust each guy rope for equal tension.

(7) Use a 10-foot guy rope and measure approximately 9 feet from the BM-22A for the location of the stakes for the guy ropes from the bottom of the BM-22A (C, fig. 3-16 and B, fig. 3-17).

Caution:

The stake should be driven into the ground at a 45° angle so that the point of the stake is directed toward the BM-22A, and the hook in the stake is facing away from the BM-22A.

(8) At the points determined in (7) above, drive the guy stakes into the ground.

(9) Tie the guy ropes from the bottom of the BM-22A to the guy stakes.

(10) Refer to figure 3-18 for a general idea of the guy stakes layout when the BM-22A is erected.

c. Siting for Guy Ropes Under Windy Conditions. Use the procedures given in (1) through (10) below when it is considered unsafe in windy conditions to raise the BM-22A with the luminescent screen installed on it. Do not install the luminescent screen on the BM-22A framework when it is being assembled (steps 6 and 7, fig. 3-11) until the procedures given in (1) through (5) below are completed. At this point, the luminescent screen is installed on the frame, and the work is continued.

(1) Connect the guy ropes to the top center, top ends, and sides of the BM-22A framework and raise the framework.

(2) Mark the exact location for the top and middle guy stakes and tie the guy ropes to the stakes (b(1) through (6)) above.

(3) Mark the exact location of the BM-22A legs on the ground (or on the boards).

(4) Mark the exact location on the guy ropes where they are tied to the guy stakes and put a loop in them so that when the BM-22A is reerected with the luminescent screen installed on

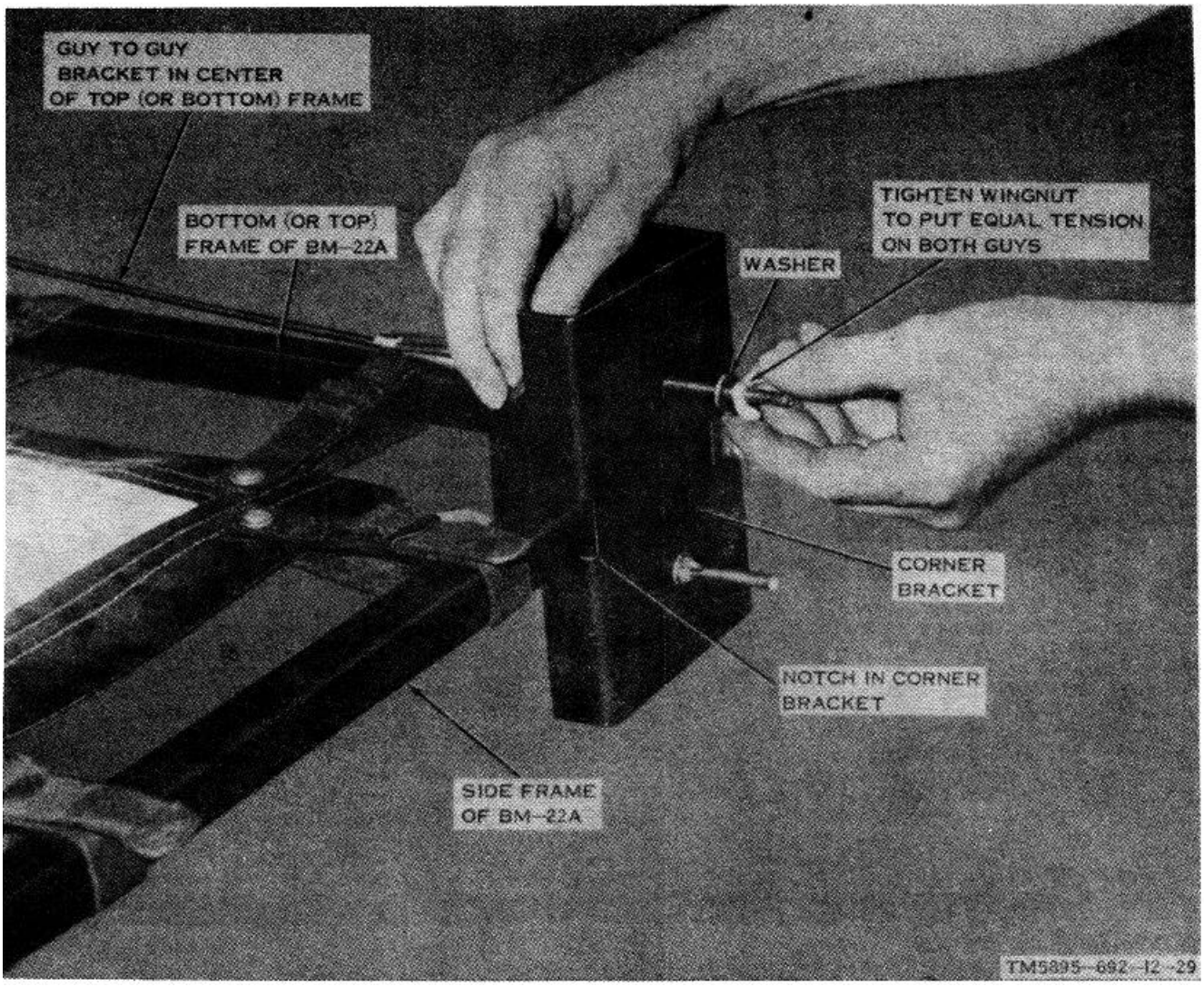


Figure 3-14. Mounting corner bracket on BM-22A framework for attachment to top (or bottom) guy bracket of BM-22A kit.

it, the prepared loops can be attached immediately to the installed guy stakes.

(5) Remove the guy ropes from the guy stakes ((1) above) and lower the BM-22A to the ground.

(6) Set the top edges of the BM-22A framework on boxes. Unfold the luminescent screen and attach it to the BM-22A framework (steps 6 and 7, fig. 3-11). Check to see that each strap is pulled tightly.

(7) With the framework still laying down, set the legs at the original spot ((3) above) and connect the prelooped top and middle guy ropes to the guy stakes that are on the side of the BM-22A which faces the wind.

(8) Raise the framework on its legs; keep a slight tension on the guy ropes. Quickly connect the remaining prelooped top and middle guy ropes to the associated guy stakes.

(9) Recheck the tension of each guy rope and adjust it for equal tension if necessary.

(10) Mark the exact location of the guy stakes for the bottom of the BM-22A and install the bottom guy ropes (b(7), (8), and (9)) above.

3-9. Disassembly of BM-22A

After the show is over, lower and fold up the BM-22A and stow it in its cases in the shelter. Use the procedures given in a through e below.

a. Lowering BM-22A.

(1) Set a box on the ground at the place where each corner of the framework would touch the ground. This precaution will keep the luminescent screen from touching the ground.

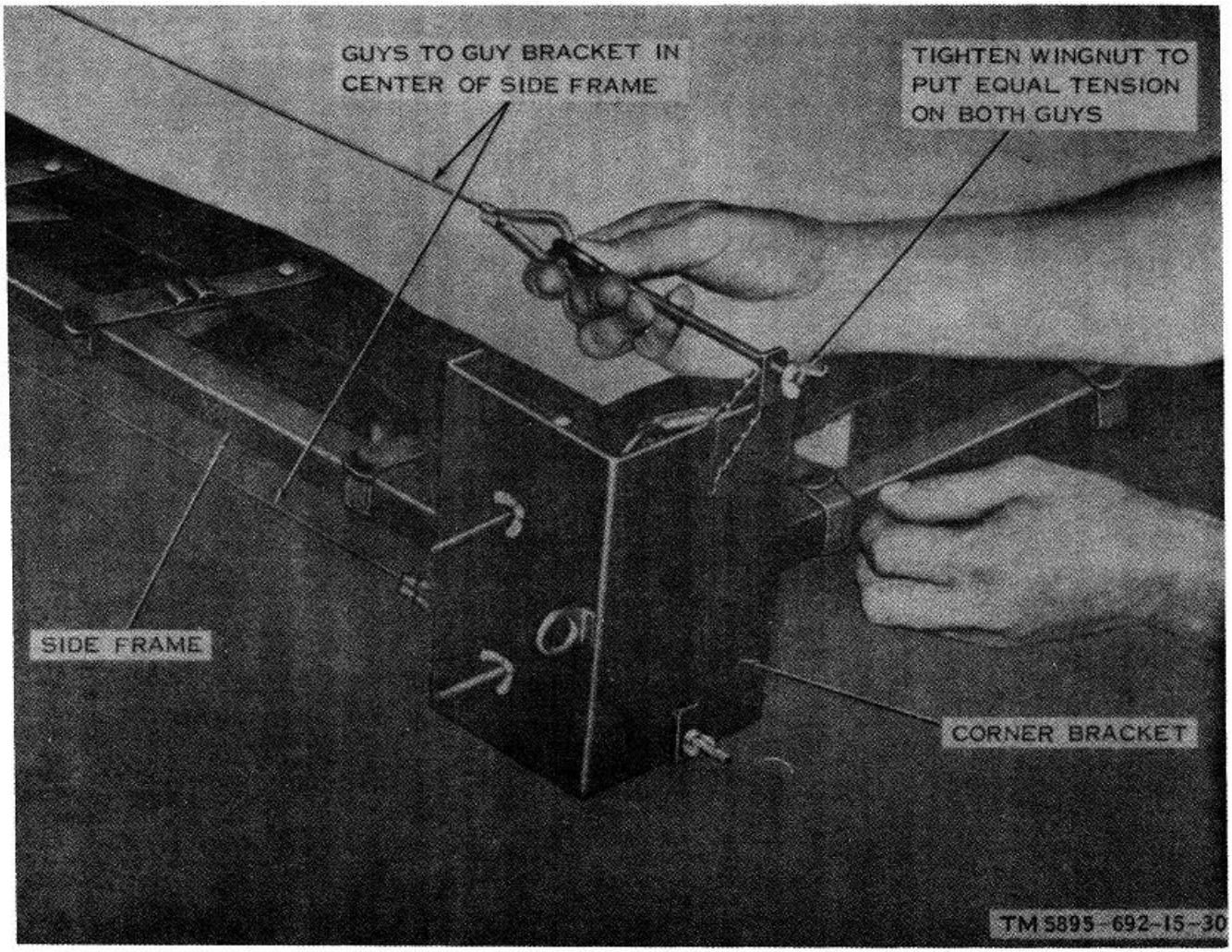


Figure 3-15. Mounting corner bracket on BM-22A framework for attachment to side guy bracket of BM-22A kit.

(2) Under windy conditions, use the procedures given below to lower the framework.

(*a*) Remove the guy ropes from the bottom and sides of the framework.

(*b*) Loosen the top guy ropes from the guy stakes that are on the framework side which is not facing the wind. Do not remove the guy ropes attached to the stakes on framework side which faces the wind.

(*c*) Lift the framework legs slightly off the ground and pull the framework bottom toward the stakes that are still holding the guy ropes. Push on the bottom of the framework to hold the guy ropes slightly taut and continue to lower the top of the framework until it rests on the boxes ((1) above).

(*d*) Remove the guy ropes from the top of the framework.

(3) When there is no danger that the framework may be endangered by winds, use the procedures given below to lower the framework.

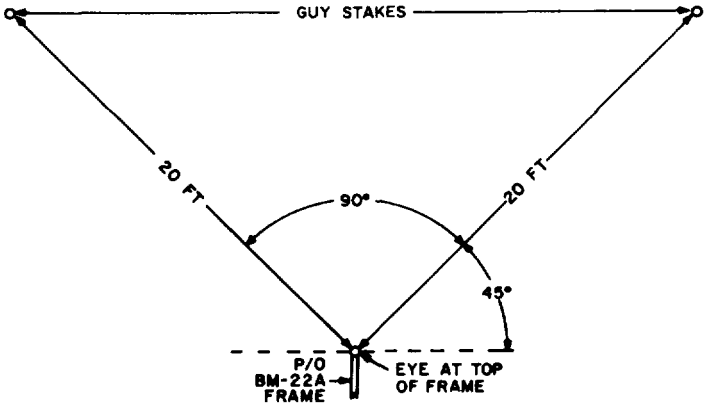
(*a*) Remove the guy ropes from the bottom and sides of the framework.

(*b*) Tilt the top of the framework and lower it until the top rests on the boxes ((1) above).

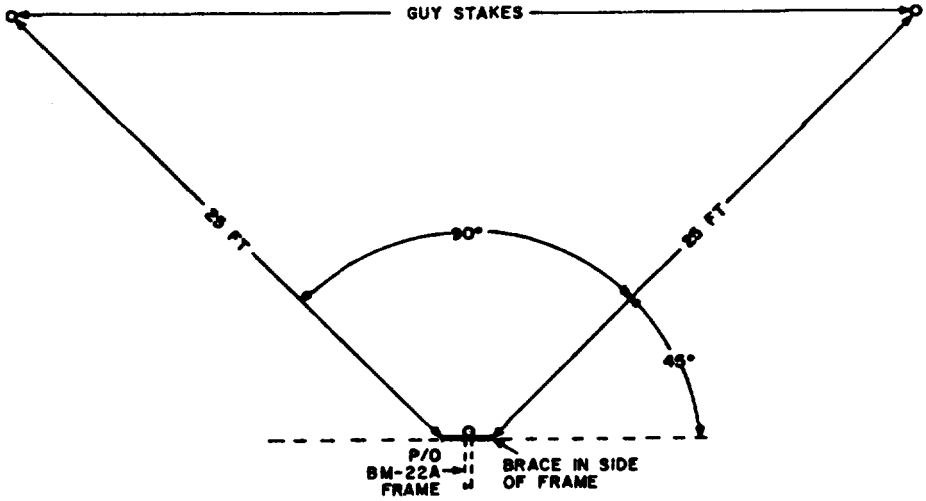
(*c*) Remove the guy ropes from the top of the framework.

b. Removal of BM-22A Kit Bracing Assemblies from Framework.

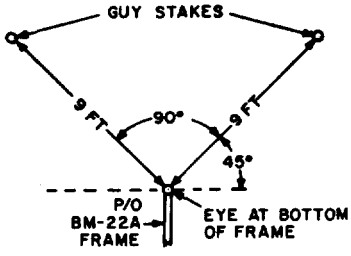
(1) On the top and bottom corner brackets, loosen the wingnuts of the wire guys that go to the brackets in the sides of the framework (fig. 3-15). After the wire guys are loosened, run the wingnuts up fully on the threads so that the small



A. DISTANCES FOR TOP GUY ROPE STAKES.



B. DISTANCES FOR MIDDLE GUY ROPE STAKES.



C. DISTANCES FOR BOTTOM GUY ROPE STAKES.

NOTE:
DISTANCES SHOWN FOR LOCATION OF GUY STAKES ARE APPROXIMATE AND ARE MEASURED IN THE ANGLE SHOWN FROM A POINT ON THE GROUND THAT IS UNDER THE CORNER OF THE BM-22A FRAME.

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Figure 3-16. Guy stakes located off ends of BM-22A frame.

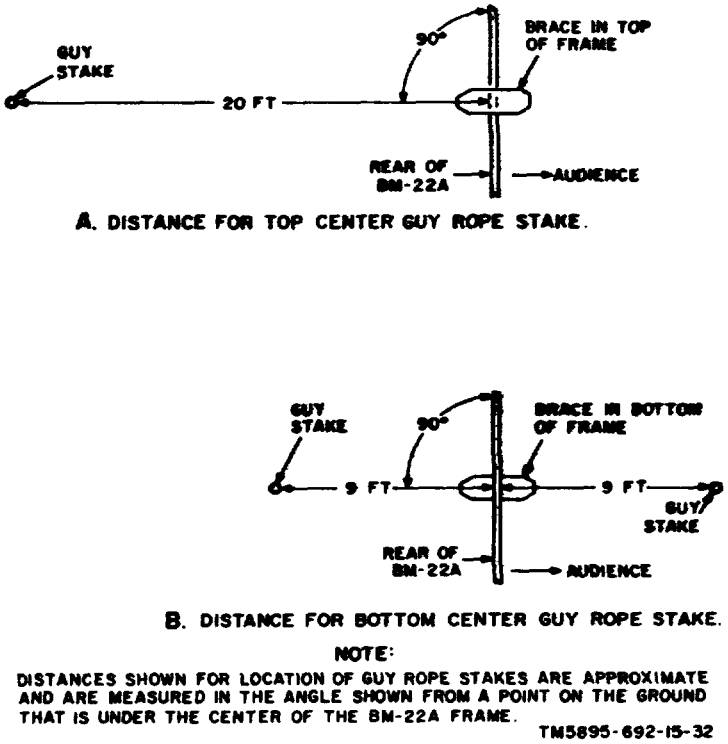


Figure 3-17. Guy stakes located off center of BM-22A frame.

plate and wingnut will not come loose and become lost.

(2) Remove the brackets on the sides of the framework. Securely tighten all the nuts and bolts on the side brackets.

(3) On the top and bottom corner brackets, loosen the wingnuts of the wire guys that go to the brackets on the top and bottom of the framework (fig. 3-14), until the corner bracket can be removed from the corner of the framework. Tighten the wingnuts so that they hold the corner bracket up against the guy wire.

c. Removing and Folding Luminescent Screen.

(1) Locate a clean, level surface approximately 3 feet larger than the luminescent screen.

(2) Remove the luminescent screen straps from the BM-22A framework.

(3) Fold the luminescent screen in half with the projection surface (luminous) up and carry the luminescent screen to the clean area.

(4) Fold up the luminescent screen as described in figure 3-19.

d. Folding Framework of BM-22A. After the BM-22A kit items (*b* above) and luminescent screen (*c* above) have been removed from the framework, use the procedures given in (1) through (4) below to fold up the BM-22A framework.

(1) Remove the corner braces from the BM-22A kit from each corner of the framework (fig. 3-12). Separate the two sections of the corner brace. Tighten the wingnuts in the locking bars to prevent the wingnuts and the locking bars from being lost.

(2) Lay the corner braces in the canvas roll from the BM-22A kit and tie up the canvas roll (fig. 3-9).

(3) Refer to figure 3-11 and disassemble the BM-22A framework. Reverse the procedures shown in the figure.

e. Stowage.

(1) Collect all the bracing assemblies (fig. 3-10); clean the assemblies and check the tightness of all the nuts and bolts. Put the assemblies in the canvas bag from the BM-22A kit (fig. 3-9).

(2) Collect all the stakes and clean them off with water and a rag. Put eight of the stakes in one of the large screen carrying cases, and seven of the stakes in the canvas bag from the BM-22A kit.

(3) Collect all the guy ropes; clean the ropes and roll them up into approximately a 1-foot diameter roll. Put four of the 27-foot and four of the 10-foot guy ropes in one of the large screen carrying cases; put five of the 27-foot and two of the 10-foot guy ropes in the canvas bag of the BM-22A kit.

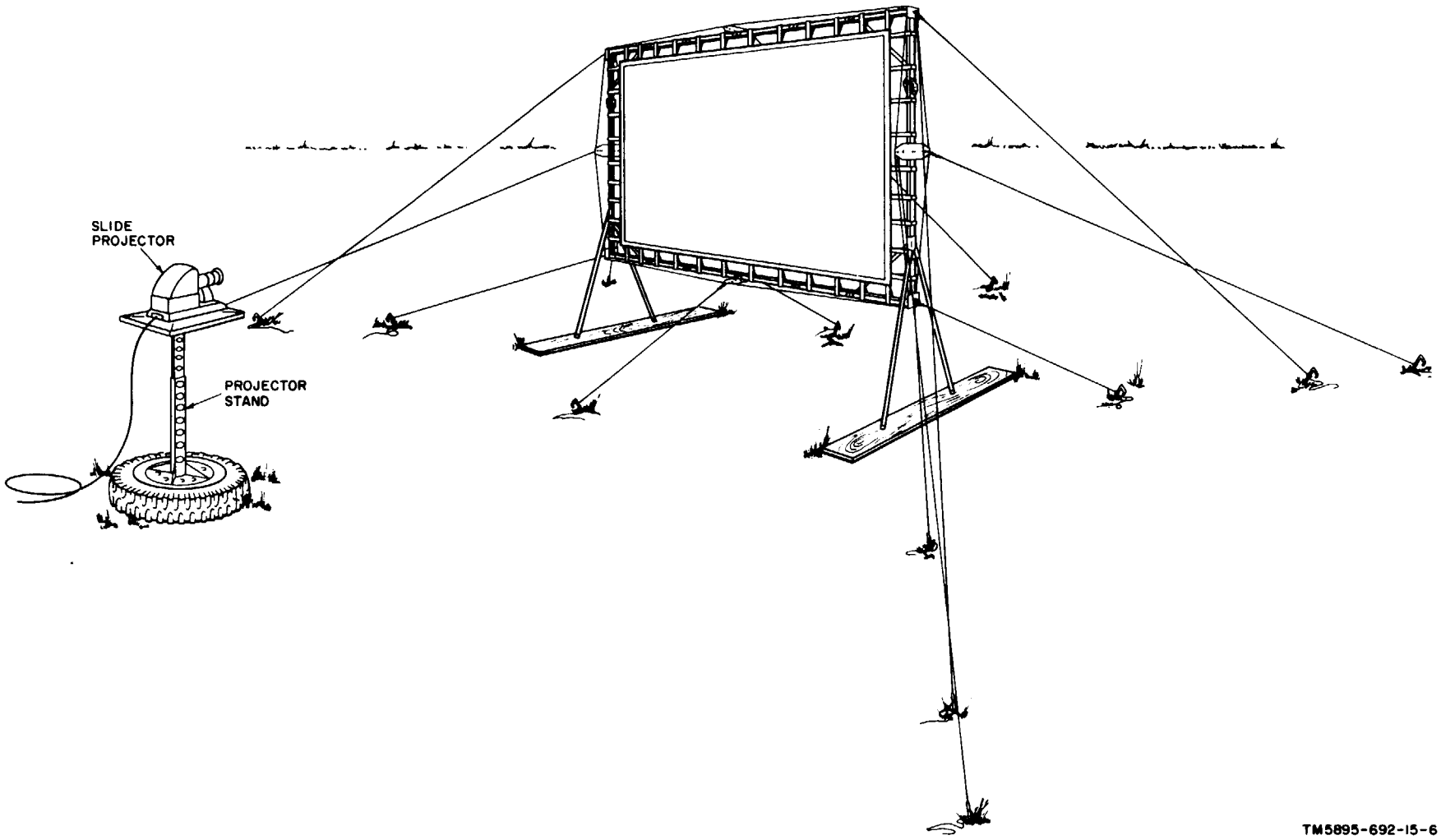


Figure 3-18. Screen, Projection BM-22A with BM-22A kit, erected for use.

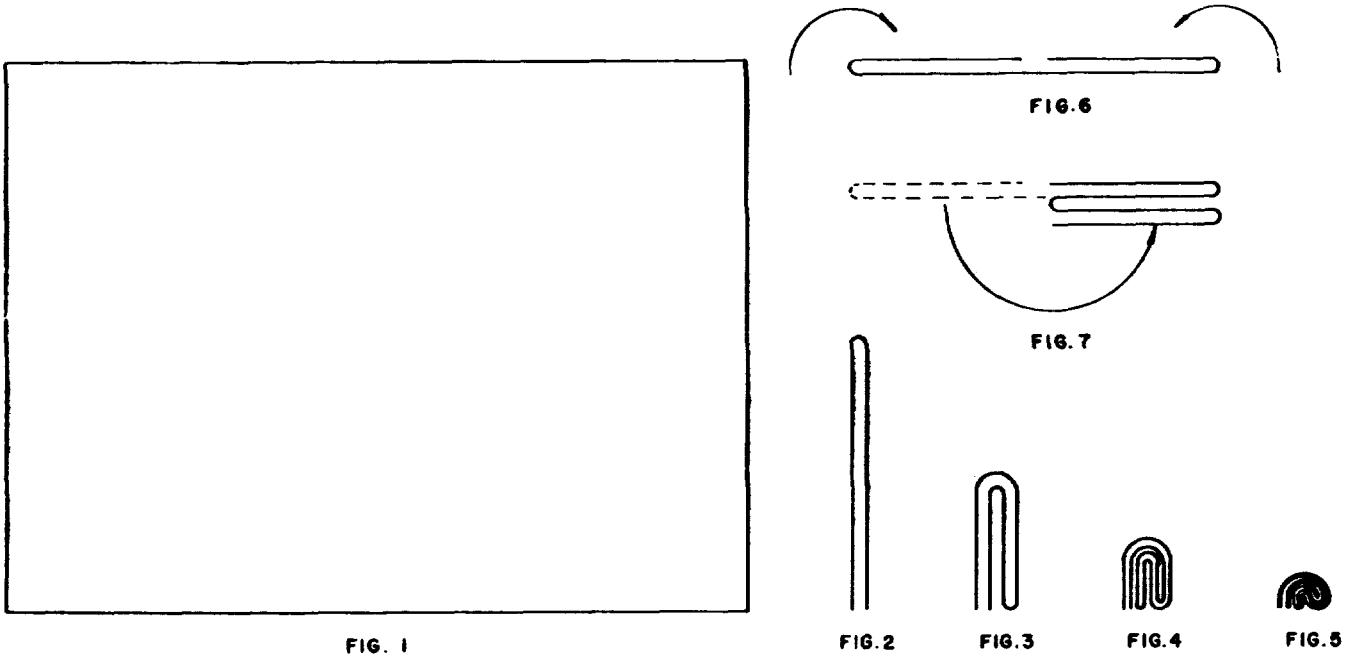


Figure 3-19. Procedure for folding luminescent screen.

(4) Clean the framework and the legs of the BM-22A. Put the folded framework and the legs in one of the large screen carrying cases.

(5) Put the folded luminescent screen in one of the large screen carrying cases.

(6) Close and stow the large screen boxes in the shelves of the shelter (figs. 1-4 and 1-7).

(7) Close the canvas bag of the BM-22A kit (fig. 3-9) and stow the bag together with the canvas roll, in which the corner braces are tied, in the shelter.

(8) Stow away the boards used to keep the BM-22A legs from sinking into the ground.

Section IV. OPERATING PROCEDURES

3-10. Motion Picture Projection

a. Siting Movie Projector. Operate the movie projector from within the shelter if the shelter is truck-mounted and the truck can be positioned at an appropriate projection site, or if the shelter is airlifted and can be set on a rise high enough to permit the beam of light to pass over the heads of the audience. However, if the film cannot be projected from within the shelter, select a site as follows:

(1) If the film must be projected from an outdoor site, position and level the truck's spare tire and wheel at the selected projection pot. Mount the projector stand on the spare tire and wheel using the tools furnished with the truck. Adjust the projection stand to the desired height, and clamp it securely in position. Set the movie projector on the projection stand, and clamp it securely in place. Figure 3-20 shows the slide projector mounted on the projector stand; the movie projector can also be mounted on the projector stand.

(2) If the film is to be projected indoors, set the movie projector on a sturdy table of sufficient height (if available); otherwise, use the projection stand and spare tire and wheel as described in (1) above.

b. Siting Screens.

(1) *Large Screen*.

(a) Select a cleared area, if outdoors, which will allow the large screen to be fully erected. A level ground area of approximately 20 feet by 30 feet is required for installation and guying of the large screen. Assemble the frame; then attach the screen. If it is windy, put on the luminescent screen after the guy stakes location is determined. Raise the entire unit, and secure the required guy wires to the unit. Attach the other end of the guy wires to guy stakes (or to trees or stumps if the ground is too wet or sandy to allow the guy

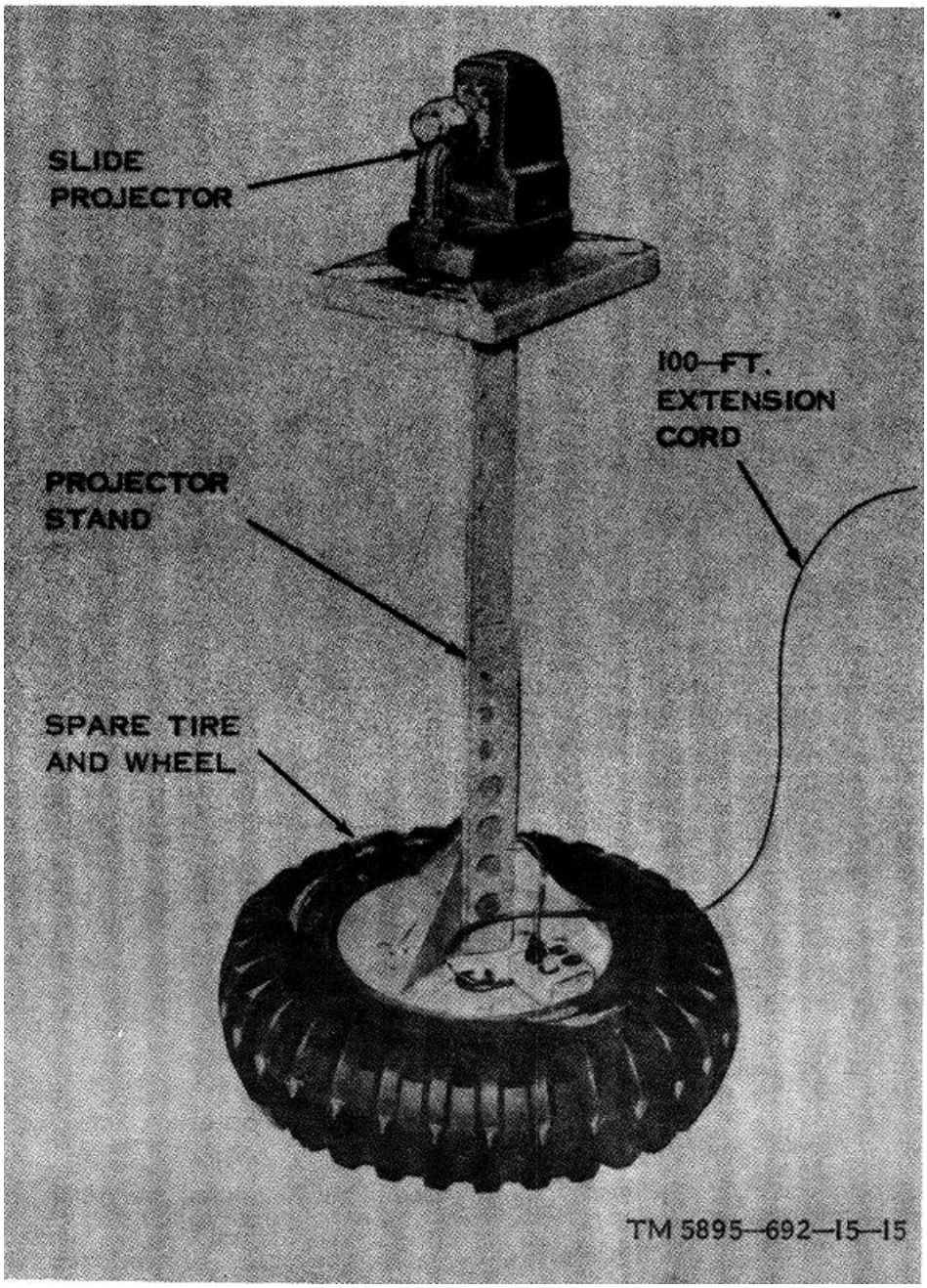


Figure 3-20. Slide projector mounted on projection stand, using spare tire and wheel as base.

wires to remain taut; or too hard, rocky, or dry to insert the guy stakes into the ground). Refer to paragraphs 3-7 and 3-8 for erection procedures.

(b) Place either the movie projector or the slide projector the appropriate distance from the screen, as determined by the type of lens used with the movie projector. The chart below furnishes this information:

Note. The chart below is based on the use of a 1,000-watt bulb.

Type of lens used	Distance between projector and screen	Maximum image size
Standard fixed focus (2 inch focal length).	75 feet (maximum)	11 ft by 14 ft.
Zoom (multifocal) (2 inch focal length).[a]	66 feet (minimum) 87 feet (maximum)	11 ft by 14 ft.
Cinemascope (anamorphic).[a]	37 1/2 feet (maximum)	5 ft by 14 ft

[a] Not part of the movie projector provided with the audio visual unit.

(2) *Small screen*. If space limitations prevent the use of the large screen, the small screen (6 feet by 6 feet) may be used. Both the distance between the small screen and movie projector and the maximum image size will be reduced. If the small screen is used outdoors, and brisk winds are prevalent, try to secure the small screen and/or tripod support to prevent the small screen from toppling over and causing possible tearing, or soiling, of the light reflective surface of the screen.

c. Siting Loudspeakers. Set a loudspeaker on each side of the screen at least 3 feet or more in front of any sound-reflecting surface to avoid reverberation. If possible, mount the loudspeakers above the heads of the audience and tilted slightly downward toward them.

d. Equipment Interconnection.

(1) Connect one end of the movie projector power cable to the power receptacle of the movie projector. For operation in the shelter, connect the other end of the movie projector power cable to the adjacent ac power receptacle in the shelter. For operation outside the shelter, use the power extension cord to interconnect the movie projector power cable and the ac power receptacle in the power entrance box.

(2) Two cables of the same length are available: one is for connecting the speakers in parallel, and the other is for connecting one of the speakers to the audio output jack at the movie projector.

Note. One cable will be designed *for speaker only*.

e. Operation. Operate the movie projector as described in TM 11-6730-210-10.

f. Large Screen Disassembly. To disassemble the large screen, follow the instructions given in paragraph 3-9. Refer to figure 3-19 for detailed instructions on properly folding the luminescent screen.

3-11. Filmstrip and Still Picture Projection with Slide Projector

a. Siting of the slide projector and large or small screen is the same as the sitting of the movie projector and large and small screen (para 3-10*a* and *b*). However, because the slide projector uses a 500-watt bulb and the movie projector is equipped with a 1,000-watt bulb, the illumination on the screen will not be as brilliant for the same distance; accordingly, it may be necessary to locate the slide projector closer to the screen to produce an image of sufficient brightness to be clear to the audience. This will reduce the size (area) of the projected image. A zoom lens (part of the audio-visual unit) is provided for use on the slide projector.

b. For projection from within the shelter, connect the slide projector power cable to the adjacent ac power receptacle in the shelter. For operation outside the shelter, use the power extension cord to interconnect the slide projector power cord and the ac power receptacle in the power entrance box.

c. If the film projection is accompanied by an oral presentation, insert the connector of the buzzer signal cable assembly into the mating connector in the shelter adjacent to the power distribution panel (fig. 1-5).

d. Operate the slide projector as described in TM 11-2332-10.

3-12. Operation of PA Set

a. Modes of Operation. The PA set may be used in any of the following modes:

(1) Mobile operation from the truck cab (*b* and *c* below).

(2) Stationary operation (within 100 feet of the shelter) (*b* and *d* below).

(3) Stationary operation (more than 100 feet away from the shelter) (*b* and *e* below).

b. Preliminary Operating Procedures. Before proceeding to operating conditions in *c*, *d*, or *e* below, perform the procedures given below.

(1) Remove the remote control unit and the microphone from the amplifier rack (fig. 1-6).

(2) Check to be sure that one connector of the branched power cable is connected to the POWER connector on the left-hand side of the junction box in the amplifier rack (fig. 3-8), and that the GAIN control of the amplifier in the rack is set *fully clockwise*.

Note. If the truck is used, check to see that the dc power cable is connected between the truck battery and the outlet on the dc control box.

(3) To check the PA set nickel-cadmium (nicad) battery, refer to TM 11-5830-240-15.

(a) To operate the PA set with the nicad battery floating on the truck battery, set the switch on the dc control panel (figs. 1-6 and 5-2) to VEHICULAR BATTERY. Run the truck on idle.

(b) To operate the PA set with only the nicad battery, set the switch on the dc control panel to SET BATTERY ONLY. Under this arrangement, the battery will last approximately 4 hours.

(c) Operate the PA set with the nicad battery connected to the battery charger (fig. 1-6) as follows:

Caution:

Always set the battery charger control switch fully counterclockwise (position A) before setting the power switch to ON or OFF. This action will prevent damage from high transient voltages which may be present when the unit is initially turned on, or when different loads are connected or disconnected.

1. On the battery charger, set the control knob fully counterclockwise to A, and set the dc control panel switch to CHARGER. Then set the battery charger power switch to ON.

Note. A no-load condition will show a high voltage indication on the battery charger voltmeter, especially when the voltage control is at, or near, fully clockwise position.

Caution:

Check to see that there is nothing on top of the battery charger. The top must be uncovered to permit proper heat exhaust from the battery charger.

2. Adjust the battery charger voltage control until the voltmeter indicates 30 volts. The ammeter indicates the current being used, the more the nicad battery is charged, the lower the ammeter indication will be. When the ammeter indication does not go lower, the nicad battery is fully charged. Continue to leave the nicad battery on charge even when the PA set is not being used.

c. Mobile Operation from Truck Cab.

(1) Perform the preliminary operating procedures given in *b* above.

(2) Connect one end of the remote cable to the CONTROL connector on the right-hand side of the junction box in the amplifier rack (fig. 3-8). Pass the other end of the remote cable through the cable entrance opening in the front of the shelter (fig. 1-6).

(3) If it has not been installed previously, install the mounting bracket for the remote control unit in the curbside rear corner of the truck cab. Tighten the thumbscrew securely.

(4) Connect the remote cable ((2) above) to the remote control unit CONTROL connector. Connect the microphone to the MIC connector of the remote control unit.

(5) Check to be sure that the 20-foot long audio portion of the branched power cable passes through the cable entrance opening of the shelter (fig. 1-6). Make sure that the other end of the cable is connected to the mating connector on the loudspeaker unit (fig. 3-8).

(6) Adjust the loudspeaker unit to the desired operating height and horizontal and vertical angles, and lock it securely in place.

(7) Check the operation of the PA set from the remote control unit as described in TM 11-5830-240-15.

d. Stationary Operation Within 100 Feet of Shelter. The PA set can be operated within 100 feet of the shelter without removal of the loudspeaker unit and the amplifier rack from the shelter. Prepare and operate it as described in b and c above, however, use the 100-ft long remote cable. The procedure given in *c*(2) above is unnecessary.

e. Stationary Operation (More Than 100 Feet From Shelter). Remove the PA set from the shelter, and assemble and operate it as described below.

(1) If connected, disconnect the following:

(a) Disconnect the dc cable plug from the bottom of the dc control panel (fig. 3-8).

(b) Disconnect the remote cable plugs from the CONTROL connectors of the junction box (in the amplifier rack) and the remote control unit.

(c) Disconnect the microphone from the remote control unit.

(d) Disconnect the 20-ft long audio portion of the branched power cable from the loudspeaker unit.

(2) Unhook and remove the outer portion of the amplifier rack.

(3) Mount the remote control unit and the microphone in the amplifier rack, and remove the rack from the wall of the shelter. Wind the remote cable and audio position of the branched power cable on the reel of the amplifier rack; assemble the two portions of the amplifier rack.

(4) Release and carefully remove the loudspeaker unit from the loudspeaker mount on the front of the shelter.

(5) At the operating site, select a site for the loudspeaker, the amplifier rack, the remote control unit, and the microphone. The remote control unit (normally carried by the person using the microphone) may be within 20 feet of the amplifier rack (20 ft remote cable used), or as far away as 100 feet from the rack (100-ft remote cable used). The loudspeaker unit site should be in front and to the side of the remote control unit site; the distance between them should be sufficient to prevent feedback of sound from the loudspeakers to the microphone.

(6) Unlatch and open the amplifier rack and support in an upright position by setting the two sections of the rack at right angles to each other.

Caution:

During operation, the amplifier rack must be in a level and upright position to provide for proper dissipation of heat from the amplifier and to prevent unwanted seepage of battery fluid that may damage the shelter and/or other components inside.

(7) Unwind the 20- or 100-ft remote cable (as appropriate) from the reel in the amplifier rack and use the cable to interconnect the CONTROL connectors of the junction box (in rack) and the remote control unit. Connect the microphone cable to the MIC connector of the remote control unit.

(8) Remove the tripod from the amplifier rack and carry the tripod and the loudspeaker unit to the site selected for the loudspeaker unit. Erect the tripod and adjust the length of the legs to provide a solid footing. Install the loudspeaker unit in the tripod, adjust the height and angle of the loudspeakers, and lock the loudspeaker unit in place.

Caution:

If toppling of the loudspeaker unit, because of high winds or uncertain footing, is a possibility, use guys, secured to the loudspeaker mounting frame, to hold the loudspeaker unit securely in place.

(9) Unwind the speaker cable from around the loudspeaker unit. Connect one end of the cable to the connector of the loudspeaker unit. Connect the other end of the speaker cable to the 20 ft long audio portion of the branched power cable.

(10) Operate the PA set from the remote control unit as described in TM 11-5830-240-15.

(11) When it is desired to broadcast a tape recorded message over the PA set, use the special tape recorder output cable to connect the REC LINE connector of the remote control unit to the tape recorder PHONES jack, and operate the tape recorder as described in TM 11-5874-200-12.

Notes.

1. The special tape recorder output cable has a *black* PJ-055 on one end and a three-contact female connector on the other end.
2. When the PA set is arranged as described in (11) above for broadcast from the tape recorder, the microphone portion of the tape recorder cannot be used.

3-13. Operation of Tape Recorder

(fig. 3-21)

Operate the tape recorder as described in TM 11-5874-200-12.

a. Recording Input From Radio. To record a broadcast as it is being received by the radio, use the special recorder input cable provided with the audio-visual unit to connect output jack J3 of the radio to the INPUT/OUTPUT jack of the tape recorder.

Note. This cable has a *red* Connector, Plug PJ-055 on one end, and a four-pin chrome-plated connector on the other end.

b. Broadcasting Tape Recorder Output Over PA Set. To broadcast a tape recording over the PA set, use the special recorder output cable provided with the audio-visual unit to connect the tape recorder PHONES jack to the REC LINE jack of the remote control unit of the PA set.

Note. This cable has a *black* Connector, Plug PJ-055 on one end, and a three-contact female connector on the other end.

3-14. Operation of Radio

Warning:

When the whip antenna on the front of the shelter (fig. 1-1) is upright, be careful that it does not touch a trolley or powerlines, especially when the truck is in motion. DEATH or injury to a person operating the radio, or destruction of the radio can occur. Refer to TB SIG 291 for precautions to be observed when using whip antennas.

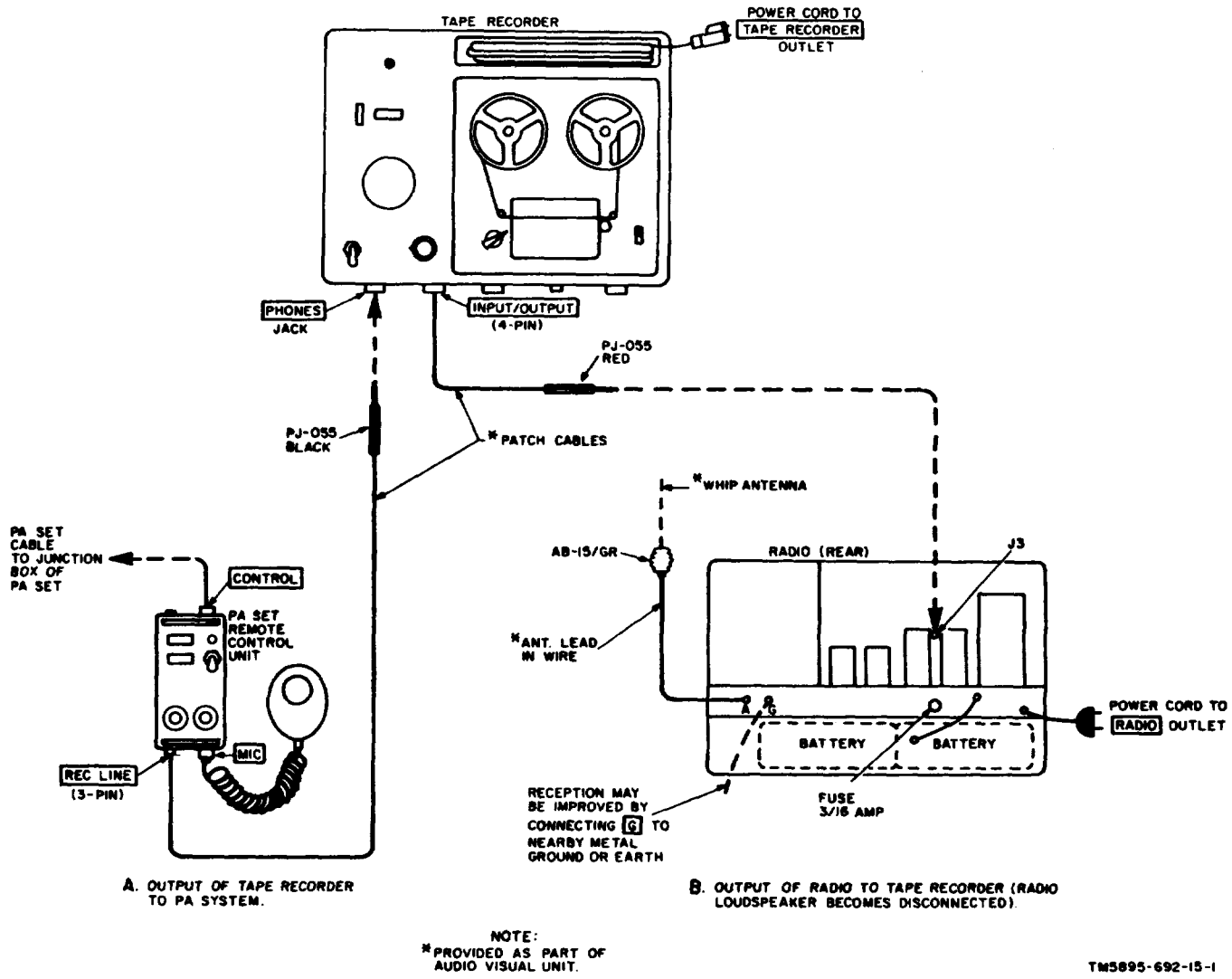


Figure 3-21. Tape recorder connections to radio and PA set.

Caution:

Remember that the metal whip antenna extends approximately 10 feet above the top of the shelter. When the whip antenna is not in use, it can be tied down to some point on the back of the shelter.

The radio is arranged for operation with a 115-volt ac power input. Check to be sure that the power input plug is fully inserted into the RADIO ac power outlet on the front wall of the shelter. Assemble the antenna mast sections (MS-116-A, MS-117A, and MS-118A), and install the assembled sections on the AB-15/GR on the front of the shelter (fig. 1-1). Check to be sure that the antenna lead-in wire is connected between the AB-15/GR and the radio (fig. 3-21). Operate the radio as described in TM 11-877.

3-15. Operation of Duplicator Kit

Use the portable typewriter or the stylus in the duplicator kit (as appropriate) to prepare stencils. Make printed copies of the stencil as described in the instruction sheet in the front cover of the duplicator kit.

Note. When the printing ink supply must be replenished, be sure to refill the cans originally received as part of the duplicator kit to permit convenient ink storage in the special recess of the duplicator kit case.

3-16. Operation of Heater

Warnings:

1. *Do not* operate the gas heater with personnel inside the shelter. Suffocation and death of personnel will result.

2. Make sure that the cover for the heater exhaust is removed on the side of the shelter (fig. 1-1).

Caution:

When preparing for transport (when the heater is to be turned off before relocating the entire mobile audio visual unit), make sure that the fuel pickup line is disconnected and stowed in the stowage tube mounted at the side of the gas can bracket. Tightly secure the cap on the gas can to avoid spillage of fuel.

The heater originally issued with the audio-visual unit is Heater, Space, Nonelectric Model UH-48, 120 volts ac, 60 cycle. For operation and maintenance of the UH-48, refer to TM 5-4520-206-15 which covers the Hunter heater operated on 24 volts dc.

a. Preliminary Procedures. Perform the operations given below before operating the heater (*b* below).

(1) *Gasoline connections* (fig. 1-9).

(a) Check to see that the heater gas can is full of fuel and tied securely to the gas can bracket.

(b) Insert the gas can adapter into the gas can and lock it to the gas can.

(c) Check to see that the fuel line fittings are tight at the gas can adapter and at the outlet on the shelter wall.

(d) Check to see that the fuel line is screwed to the receptacle at the rear of the heater in the shelter.

(2) *Exhaust vent*. Open the heater exhaust port on the outside of the shelter (fig. 1-1).

(3) *Ac power and thermostat.*

(a) Check to see that the ac power cable connector is screwed tightly to the power receptacle on the front of the heater.

(b) Check to see that the room thermostat cable connector is screwed tightly to the thermostat receptacle on the front of the heater. Check to see that the other end of the cable is connected to the room thermostat.

b. Starting and Operation. After the procedures given in *a* above have been completed, perform the procedures given in (1) through (5) below to start and operate the heater.

(1) Set the shelter thermostat to the temperature desired in the shelter. When the desired shelter temperature is reached, the heater automatically turns off; when the shelter temperature drops below the room thermostat setting, the heater automatically turns on.

(2) Set shelter circuit breaker CB1 in the power distribution panel to ON.

(3) Set the heater ON-OFF switch to ON; the white pilot lamp lights, indicating that the heater is operating normally.

(4) Internally, the heater starts to pull the fuel from the gas can, starts an igniter which ignites the fuel, and turns on the heater exhaust fan. When the required shelter temperature is reached, the ignition system automatically turns off, but the exhaust blower continues to run for approximately 2 minutes to clean out the heater system.

(5) If the red pilot light comes on, and the heater stops operating, wait approximately 2 minutes; then, depress the RESET pushbutton (time delay switch), and set the ON-OFF switch to ON. If the heater fails to start at this point, make the following checks:

(a) Check to see if the shelter thermostat is set high enough to require the heater to start.

(b) Check to see if there is fuel in the heater gas can.

(c) Check to see that the fuel line connections are tight.

(d) Replace the igniter plug.

(e) Check to see if the fuse is blown.

3-17. Operation of Power Unit

For operation of the power unit, refer to TM 5-6115-271-15. Make sure that the power cable is properly connected to the power unit L1 and L2 load terminals, and to the ground terminal stud on the power unit load terminals (para 3-6*b*) and that the ground rod is secured to the power unit or to the shelter (fig. 3-7).

3-18. Operation of Camera

Refer to TM 11-6720-239-12 for operation of the camera.

CHAPTER 4

OPERATOR AND ORGANIZATIONAL MAINTENANCE

Section I. PREVENTIVE MAINTENANCE

4-1. Scope of Operator and Organizational Maintenance

a. General.

(1) Operator's preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, reduce downtime, and maintain the equipment in serviceable condition. Operator preventive maintenance is performed daily and weekly; specific procedures are provided in paragraphs 4-3 and 4-4.

(2) Organizational preventive maintenance is performed monthly and quarterly; specific procedures are provided in paragraphs 4-5 and 4-6. Trouble-shooting information is provided in paragraph 4-7, and organizational repair instructions are given in paragraph 4-8.

(3) The preventive maintenance checks and services described in paragraphs 4-3 through 4-6 outline inspections to be made at specific intervals and are designed to help maintain equipment in serviceable condition. They indicate what items should be checked and how they should be checked. Also included are procedures for authorized repairs, and references to paragraphs, illustrations, and other manuals that contain supplementary information.

(4) Defects that cannot be corrected must be reported to higher category maintenance personnel. Records and reports of repair and preventive maintenance must be made in accordance with procedures given in TM 38-750.

b. Preventive Maintenance Checks and Service Periods. Preventive maintenance checks and services are required daily (para 4-3), weekly (para 4-4), monthly (para 4-5), and quarterly (para 4-6). These checks must be performed during the specified intervals. Also, the daily checks and services must be performed under the special conditions listed below.

(1) When the equipment is initially installed.

(2) When the equipment is reinstalled after removal for any reason.

(3) At least once each week if the equipment is maintained in a standby condition.

c. Cleaning.

Warning:

Prolonged breathing of cleaning compound is dangerous; make sure that adequate ventilation is provided. Cleaning compound is flammable; *do not* use near a flame. Avoid contact with the skin; wash off any that spills on the hands.

(1) Use a dry, clean, lint-free cloth or brush to remove dirt. If necessary, moisten the cloth or brush with Cleaning Compound (Federal stock No. 7930-395-9542). After cleaning, wipe dry with a cloth.

Warning:

Compressed air is dangerous and can cause serious bodily harm. It can also cause mechanical damage to the equipment. Do not use compressed air to dry parts where cleaning compound has been used.

(2) Dry, compressed air, not to exceed 60 pounds per square inch, may be used to remove dirt and dust from inaccessible places.

d. Touchup Painting. Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB SIG 354 and TB SIG 364.

4-2. Tools, Test Equipment, and Materials Required

a. Tools and Test Equipment. The tools and test equipment required for maintenance of the AN/MSQ-85 components are listed in the applicable equipment technical manuals (app A).

b. Materials. The materials required for maintenance of the AN/MSQ-85 components are listed

in the equipment technical manuals (app A). The following items are also required:

Item	*Federal Stock No.*
Cleaning compound	7930-395-9542
Grease, Graphite FED VV-G-671 (8 oz. tube)	9150-753-4648
Lubricating Oil, Engine MIL-L-2104 (1 qt can)	9150-265-9425
Lubricating Oil, General Purpose (FED VV-L-800) (4 oz. can)	9150-273-2389

4-3. Operator's Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	Reference
		EXTERIOR	
1	External condition	Check for skin punctures, cracks, or open seams that could permit moisture to enter wall.	None
2	Grounding system	Check grounding system to see that it is properly installed.	Para 3-6*a*, fig. 3-7.
3	Sling assembly	Check tightness of sling assembly turnbuckles.	Para 3-4*d*(3), fig. 3-2.
4	Power entrance box	*a.* Clean area around ground post and receptacles.	*a.* None.
		b. Close covers on unused receptacles to keep out moisture, dirt, and sand and to protect contacts.	*b.* None.
5	Power cable assemblies	*a.* Clean cable insulation and connectors	*a.* None.
		b. Check tightness of cable connections.	*b.* None.
		c. Put covers on unused cable connectors to keep out moisture, dirt, and sand, and to protect contacts.	*c.* None.
		INTERIOR	
6	Signal and power cables, cords, wires, and patching cords.	*a.* Check tightness of connections of plugs and connectors.	*a.* None.
		b. Check for damaged insulation. Remove kinks and strain.	*b.* None.
7	Walls, ceiling, and floor.	Check for holes, open seams, or signs of leaks or water seepage.	None.
8	Flashlight	Check operation; if inoperative, check batteries and lamp.	None.
9	Knobs, dials, and switches.	While making operational checks (sequence No. 10 through 19), check each knob, dial, and switch for positive action and absence of binding.	None.
10	Shelter fluorescent lights.	Operate circuit breaker CB1 and LIGHTS switch to ON; ceiling and table lamps should light. Replace defective lamps or starters.	None.
11	Emergency	If shelter is truckmounted, operate EMERG switch to ON; emergency lamp should light. Replace defective lamp.	None.

Sequence No.	Item to be inspected	Procedure	Reference
12	Heater	Clean exterior and check operation.	Para 3-16.
13	Battery charger	Clean exterior and check operation.	Para 3-12*b*(3) *(c).*
14	Movie projector	Perform required daily checks and services	TM 11-6730-210-10.
15	PA set	Clean exterior of components; check operation and battery fluid level.	TM 11-5830-240-15.
16	Slide projector	Perform required daily preventive maintenance checks and services	TM 11-2332-10.
17	Tape recorder	Perform required daily preventive maintenance checks and services	TM 11-5874-200-12.
18	Radio	Perform required daily preventive maintenance checks and services.	TM 11-877.
19	Power unit	Perform required daily preventive maintenance checks and services.	TM 5-6115-271-16.
20	Truck	Perform required daily preventive maintenance checks and services.	TM 9-8080.
21	Large screen	Perform required daily preventive maintenance checks and service.	TM 11-2336.

4-4. Operator's Weekly Preventive Maintenance Checks and Services

Perform weekly preventive maintenance checks and services on the following equipment as described in the listed publication:

a. Movie set (TM 11-6730-210-10).
b. Slide projector (TM 11-2332-10).
c. Tape recorder (TM 11-5874-200-12).
d. Radio (TM 11-877).
e. Truck (TM 9-8030).
f. Decontaminating Apparatus, Portable, DS2, 1 1/2 Quart, ABC-M11 (TM 3-4230-204-15).

4-5. Organizational Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	Reference
		EXTERIOR	
1	Shelter skin and hardware.	Paint blistered and pitted flaking areas and bare metal spots (such as steps, entrance opening covers, skids, towing eyes, etc.).	TB SIG 354.
2	Grounding system	Clean ground stud connections.	None.
3	Sling assembly	Clean parts	Fig. 3-2
4	Door	*a.* Clean; paint bare metal	*a.* None.
		b. Tighten loose screws and bolts.	*b.* None.
		c. Lubricate door locks and latches with grease (FED VV-G-671); lubricate hinges with oil (FED VV-L-800 or MIL-L-2104).	*c.* None.
		d. Put gasket cement on loose gaskets.	*d.* None.

Sequence No.	Item to be inspected	Procedure	Reference
5	Power entrance box and hinged opening covers.	*a.* Lubricate hinges of covers with oil (FED VV-G-671 or MIL-L-2104).	*a.* None.
		b. Paint bare metal spots.	*b.* None.
6	Power cable assemblies	*a.* Temporarily repair insulation cuts and abrasions with electrical insulation tape; replace defective cable assemblies.	*a.* App D.
		b. Inspect cable layout, and relocate cables as necessary so that they are not endangered by vehicles and are not dangerous to personnel.	*b.* None.
		INTERIOR	
7	Signal and power cables, cords, and wires.	*a.* Check tightness of screws and clamps that hold wires to terminals.	*a.* None.
		b. Temporarily repair insulation cuts and abrasions with electrical insulation tape; replace defective cables.	*b.* App D.
		c. Cover unconnected bare wires with electrical insulation tape to prevent damage to equipment and injury to personnel.	*c.* None.
8	Power and lighting system.	*a.* Tighten loose screws, bolts, and clamps.	*a.* None.
		b. Replace defective parts.	*b.* App D.
9	Equipment mountings	Check tightness of bolts, nuts, and screws that secure equipment to mounting racks and mounting racks to shelter wall. Replace missing bolts, nuts, and screws.	None.
10	Movie set	Perform applicable monthly preventive maintenance checks and services.	TM 11-6730-210-20.
11	Slide projector	Perform applicable monthly preventive maintenance checks and services.	TM 11-2332-20.
12	Radio	Perform applicable monthly preventive maintenance checks and services.	TM 11-877.
13	Telephone	Perform applicable monthly preventive maintenance checks and services.	TM 11-2155.

4-6. Organizational Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	Reference
		GENERAL	
1	Components:		
	a. Inventory	*a.* Inventory equipment; requisition missing and defective parts.	*a.* App B.

Sequence No.	Item to be inspected	Procedure	Reference
	b. Location of parts	*b.* Check to see that all components are mounted or stowed in assigned places.	*b.* None.
		EXTERIOR	
2	Shelter skin and hardware.	*a.* Check for skin punctures, cracks, or open seams that would permit moisture to enter wall.	*a.* TB SIG 354.
		b. Repair or replace defective hardware	*b.* None.
3	Grounding system	Replace ground rod if ground lead cannot be securely tightened. Replace ground lead if it is cut, corroded, or broken.	None.
4	Door	Replace defective or missing rubber gaskets, or those that do not provide watertight seal. Replace broken door hinges and latches	TB SIG 354.
5	Power entrance box	*a.* Carefully remove sand, dirt, and moisture from contact. and cable connectors.	*a.* None.
		b. Tighten locknuts, screws, and bolts that hold receptacles.	*b.* None.
		c. Replace defective parts.	*c.* App D.
6	Power cable assemblies	Replace cable assemblies in which wiring, insulation, or connectors are defective	App D.
		INTERIOR	
7	Equipment power cables.	*a.* Neatly dress all cables, wires, and cords with cable and cord clamps provided in assemblage; or use electrical insulation tape and twine.	*a.* None
		b. Repair or replace defective cables, cords, wires, and patching cords.	*b.* App D.
8	Walls, ceiling, and floor.	Paint blistered, pitted, or flaking areas and bare metal spots.	None.
9	Fire extinguisher	*a*. Refill if weight of contents is less than prescribed, or if seal is broken.	*a.* Performed by appropriate personnel.
		b. Replace if valve assembly is damaged.	*b.* Performed by appropriate personnel.
10	Chairs	Repair or replace chair if parts are bent or broken, or if chair is unsafe for use.	App D.
11	Sledge hammer	Replace if handle is broken, split, or does not fit head tightly.	App D.

4-7. Troubleshooting

a. General. The symptoms in the troubleshooting chart (b below) are based on the operational checks in the daily preventive maintenance checks and services chart (para 4-3). To troubleshoot the AN/MSQ-85, perform all functions starting with sequence No. 12 in the daily preventive maintenance checks and services chart, and proceed until an abnormal condition is observed. When an abnormal condition is observed, refer to the troubleshooting chart (*b* below). Perform the checks and corrective measures indicated in the troubleshooting chart. If the corrective measures do not result in correction of the trouble, higher category maintenance is required. Refer to listing of repair parts authorized for organizational maintenance given in appendix D.

b. Troubleshooting Chart.

Item No.	Symptom	Probable trouble	Corrective measure
1	Fluorescent lamps do not light.	*a.* All lamps inoperative:	*a.* Correct as follows:
		(1) Defective or dis-connected LIGHTS witch.	(1) Replace or connect switch.
		(2) Defective or dim connected circuit breaker CB1.	(2) Replace or connect circuit breaker.
		b. Not all lamps inoperative:	*b.* Correct as follows:
		(1) Defective lamp.	(1) Replace lamp.
		(2) Defective starter.	(2) Replace starter.
2	Heater does not operate properly.	*a.* Heater not receiving fuel.	*a.* Check fuel supply; replenish if necessary. If fuel supply is adequate, refer to technical manual (app A).
		b. Ac power cord not connected properly.	*b.* Connect cord properly to ac outlet.
3	Equipment does not operate properly.	See appropriate equipment technical manual (app A).	See appropriate equipment technical manual (app A).
4	Battery charger does not indicate charging action.	*a.* Ac power cord not connected properly.	*a.* Connect cord properly to ac outlet.
		b. Dc power cord not connected properly.	*b.* Connect cord properly to battery (plus to plus terminal; minus to minus terminal).
		c. Defective fuse.	*c.* Replace 3-ampere fuse.

4-8. Organizational Repair

a. Shelter Repair. Organizational repair of the shelter includes:

(1) Location and correction of faults in the ac power and signal circuitry of the shelter.

(2) Replacement of the items listed below (app D). (Procedures for removal and replacement are apparent upon inspection.)

(a) Three-ampere fuse in battery charger.

(b) Incandescent lamps.

(c) Fluorescent light parts (lamps and starters).

(d) Dc power cable battery clips and rubber insulators

(3) Limited repair of the shelter is described in TB SIG 354.

b. Equipment Component Repair. Perform authorized organizational repair procedures for the equipment components as described in appropriate technical publications (app A).

c. Battery Maintenance. Refer to paragraphs 4-9 through 4-12 for information on maintenance of the batteries used in the audio-visual unit.

Section II. BATTERY MAINTENANCE

4-9. General

There are three batteries in the audio-visual unit: a 24-volt, lead-acid battery for the truck; 11.5-volt, nickel-cadmium batteries in the tape recorder; and a 26-volt, nickel-cadmium battery for the PA set. Maintenance and charging information on these batteries is given in paragraphs 4-10, 4-11, and 4-12. Also, 1.5-volt dry cells (2) are used for the TA-312/PT and the flashlight.

4-10. Truck Battery

The 24-volt truck battery is charged by the normal voltage output of the truck voltage regulator. Standard lead-acid battery maintenance of the truck battery is applicable. A few important maintenance items are given in *a*, *b* and *c* below.

a. To check the truck battery voltage, set the DC CON switch inside the shelter to SET BATTERY ONLY or to CHARGER. Stop the truck engine from running; set the ignition switch to ON to put a load on the battery. The voltage measured across the positive and negative terminals of the truck battery should be not less than 22.5 volts.

b. Check the condition of each truck battery cell with a hydrometer. A hydrometer indication of approximately 12.60 indicates the cell is charged. Replace or recharge the truck battery if the hydrometer indication is less than 11.30 for any one battery cell.

Caution:

The cable leading to the D.C. IN receptacle inside the shelter should be connected as follows: white lead to the positive terminal of the truck battery, and the black lead to the negative terminal.

c. Remove all corroded material from the cables connected to the truck battery; use a stiff brush. Wash the terminals with caustic soda (baking soda). Put petroleum jelly on the battery terminals before tightening the battery cable connectors on the battery terminals. *Make sure that the negative terminal of the battery (which is smaller than the positive terminal) is connected to the battery cable that is attached to the truck chassis*. Coat the battery terminals and cable terminals with petroleum jelly to retard corrosion.

4-11. Tape Recorder Battery

a. The nickel-cadmium batteries used in the tape recorder (TM 11-5874-200-12 and TM 11-5874-200-45) are charged by an internal battery charger when the tape recorder is connected to a 115-volt ac power source. Check the tape recorder battery under the conditions listed below:

(1) At the completion of a day's operation.

(2) When the tape recorder is being used daily.

(3) Before use after the tape recorder has been stored or not operated for more than a day.

b. For instructions on determining the condition of the tape recorder batteries and for recharging them, refer to TM 11-5874-200-12. For instructions on maintaining nickel-cadmium batteries, refer to TM 11-6140-203-12 and TM 11-6140-203-35.

c. When the batteries are fully charged, the tape recorder can be operated continuously in excess of 6 hours during recharging action.

4-12. PA Set Battery

The 26-volt battery used in the PA set (TM 11-5830-240-15) is a nickel-cadmium (nicad) battery which consists of 20 cells (approximately 1.3 volts per cell). The nicad battery is charged by the battery charger at 29 to 30 volts. The voltage of a lead-acid battery (such as the truck battery) drops lower and lower as it is operating the equipment until there is not enough voltage to run its equipment; however, the nickel-cadmium battery produces its full-rated voltage and power until it is almost discharged. The battery for the PA set will operate the equipment in the PA set for approximately 2 to 3 hours before it is dead; at this point, it must be charged. To charge the battery, use the battery charger procedures given in paragraph 3-12*b*(3) *(c)* A few important maintenance features for a nickel-cadmium battery are given below:

Warning:

The electrolyte is a strong alkaline solution that is harmful to skin and clothing. Use a 3-percent solution of boric acid to neutralize any electrolyte that has spilled; then flush thoroughly with cold water.

a. Electrolyte.

(1) The electrolyte is a 31-percent (by weight) solution of potassium hydroxide (KOH) in distilled water (1.30 to 1.31 specific gravity at 80° F). During charging and discharging, no appreciable chemical change takes place in the electrolyte; therefore, testing the specific gravity of the electrolyte does not determine the state of battery charge.

(2) Keep the level of the electrolyte approximately one-quarter of an inch above the plates. The level can be seen through the slots in the side of the battery.

Cautions:

1. *Do not* use any tool, bulb syringe, or electrolyte that has been used on lead-acid batteries for a nickel-cadmium battery. Contamination from any item that has been in contact with the electrolyte of a lead-acid battery can render a cell of the nickel-cadmium battery inoperative.

2. Always use *distilled water* to raise the electrolyte level in a cell; *do not* use tap or chlorinated water.

Warning:

Explosive gas may be released during charging; be sure that the shelter is well ventilated. Turn the battery charger off when the nicad battery is removed. Do not use matches or an open flame in the shelter while the nicad battery is being charged. Guard against short circuits; arcs resulting from short circuits may cause an explosion.

b. Charging. Use the battery charger to determine the condition of charge of the PA set nickel-cadmium battery. Adjust the voltage of the battery charger to 29 volts. The battery charger ammeter should indicate near 0 when the battery is fully charged; the more the battery is discharged, the higher the ammeter indication will be.

(1) A nickel-cadmium battery should be *run down* on purpose to keep it in a good state of charge. This is accomplished by operating the PA set from the battery for 2 to 3 hours. At the end of this time, recharge the nicad battery until the battery charger ammeter is at its lowest reading and there is no further reduction in ammeter current.

(2) If distilled water is to be added to the battery because the electrolyte is low, it should be added when the battery is in its *discharged* condition; then the battery must be charged.

(3) Using a voltmeter, such as Multimeter AN/URM-105, to check the condition of charge of the nickel-cadmium battery is an ineffective way to check the charged state of a nickel-cadmium battery because the voltage remains almost at maximum until just before the battery is in a discharged state. Use the ammeter indication on the battery charger ((1) above) to determine its charge state.

c. Maintenance.

(1) *Connections*.

(a) If loose connections are located, tighten the terminal screws.

Caution:

Do not use cleaning compound on an assembled battery. Metal parts should be removed for cleaning. Damage to individual cells may result if the cleaning compound gets into the cell.

(b) If the cell terminals or the terminal links are corroded (as evidenced by white potassium catrbonate deposits) and disassembly of the battery is not required, clean the cell terminals, the terminal links, and the cells.

(c) If the battery is removed and replaced, make sure that the positive battery terminal is connected to the white cable connectors (fig. 5-2).

(2) *Electrolyte*. If electrolytic leakage is discovered, inspect each cell for cracking; replace defective and leaking cells.

(3) *Voltage measurements*. Voltage measurements may be used to detect defective cells, improperly installed cells, or loose or corroded links. To make the measurements, measure the terminal voltage between the output positive and negative terminals; approximately 28 volts should be measured.

(a) Leave the voltmeter positive lead connected to the positive terminal on the end of the battery and connect the voltmeter negative terminal to the positive terminal of the first cell; voltage indication should be approximately 1.3 volts.

(b) Move the voltmeter negative lead to the negative terminal of the second cell; voltage indication should be exactly the same as measured in *(a)* above. If the voltage is less, check the tightness of the link connection.

(c) Move the voltmeter negative lead to the positive terminal of the second cell; voltage indication should be approximately 2.6 volts. If the voltage is less, the cell is probably defective and should be replaced.

(d) Move the voltmeter negative lead to the positive terminal of the third cell; the voltage indication should be exactly the same as measured in *(c)* above.

(e) Continue moving the voltmeter lead to the negative and positive terminals of the succeeding cells and note the voltage indication obtained. The voltage indication should increase by approximately 1.3 volts per cell.

CHAPTER 5

FUNCTIONING OF CIRCUITS

5-1. General

a. The functioning of the following components of the AN/MSQ-85 are given in the associated technical manuals (app A):

(1) Projector, Motion Picture, Sound AQ-4A(1) (part of Projection Set, Motion Picture, Sound AS-7A).

(2) Projector, Still Picture AP-9(1).

(3) Recorder-Reproducer Set, Sound AN/UNH-10.

(4) Radio Receiver R-520A/URR.

(5) Camera, Polaroid Model 250.

(6) Generator Set, Gasoline Engine, 3 Kw, Ac, 60 Cycle (Military Model S 3.0 MD) (FSN 6115-075-1640 or FSN 6115-913-9290).

(7) Decontaminating Apparatus, Portable, DS2, 1 1/2 Quart, ABC-M11.

(8) Truck, Cargo, 3/4-Ton, 4X4, M37B1.

(9) Telephone Set TA-312/PT.

(10) Heater, Space, Nonelectric, Hunter Model UH-48.

Note. The heater issued with the audio visual unit is operationally and for maintenance purposes similar to the Hunter model heater described in TM 5-4520-206-15.

b. The functioning of the other components of the AN/MSQ-85 are given in paragraphs 5-2 through 5-5.

5-2. Shelter

a. Refer to paragraphs 1-7*a* and 14*a* for a description of the shelter.

b. Predrilled holes have been set in various places on the outside of the shelter to mount the following items:

(1) The 2- by 4-inch board to keep the front of the shelter away from the front of the truck bed. This space permits the loudspeaker mast to be lowered.

(2) Loudspeaker mounting.

(3) Mounting for the AB-15/GR.

(4) Heater gas can bracket.

(5) Lifting boom.

(6) Gas can rack. The rack for the truck pioneer tools is attached to the gas can rack.

5-3. Shelter Ac Power Distribution

(fig. 5-1)

a. Ac power for the shelter is normally obtained from the power unit (fig. 3-7), or from an equivalent ac power source.

b. To protect personnel and equipment, the ground circuit is connected to earth. The earth connection is made by attaching the buried ground rod either to the GROUND terminal in the power entrance box or to the ground stud on the power unit (fig. 3-7). Throughout the shelter, the power distribution panel and power outlets are bonded to the metal ductwork which carries the wires.

c. Figure 5-1 shows how main circuit breakers CB1, CB2, and CB3 in the power distribution panel control power to separate circuits in the shelter. Throughout the shelter, switches control ac power to the lights, the fans, and the slide projector outlet, and the external light outlets in the power entrance box.

5-4. Shelter Dc Power Distribution

(fig. 5-2)

a. Dc power distributed in the shelter is used by the PA set and the emergency light. The PA set is powered only by its own nickel-cadmium battery which applies de to the PA set junction panel, from which it is applied to the audio amplifier and the remote control unit.

b. The battery charger, the PA set battery, the truck battery, and the emergency light are connected to the dc control box.

(1) When dc control box DC CON switch 86 is set to BET BATTERY, the PA set is run by the nicad battery.

(2) When the DC CON switch is set to CHARGER, the PA set nicad battery is connected to the output of the battery charger.

(3) When the DC CON switch is set to VEHICLE BATTERY, the truck battery is connected in parallel with the PA set battery.

(4) When EMERG LIGHT switch S7 is set to the *on* position, the emergency light is powered either by the PA set nicad battery, when dc control panel DC CON switch S6 is set to VEHICLE BATTERY, or by the truck battery.

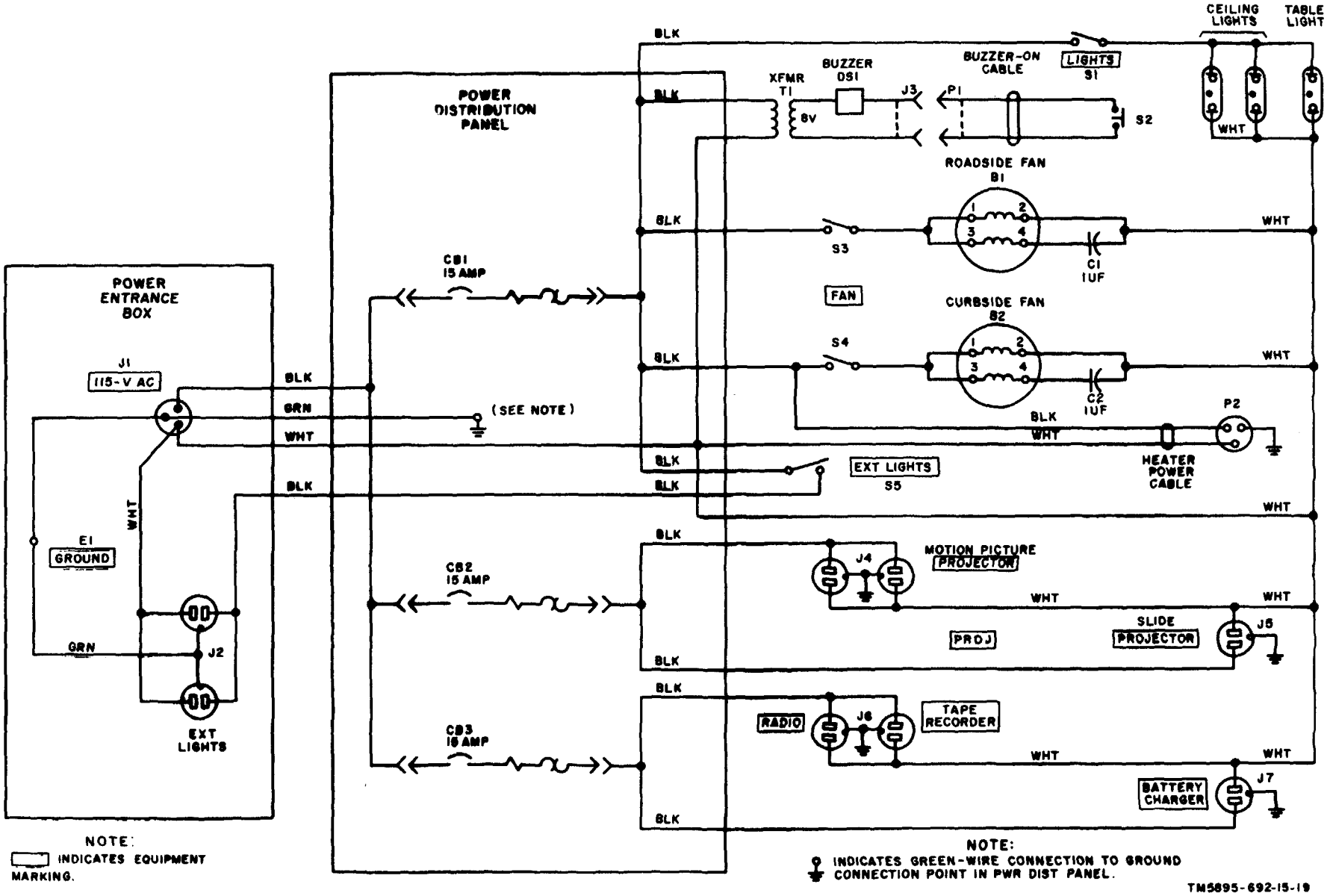


Figure 5-1. Shelter ac power distribution diagram.

(5) Fuse F1 provides protection for the truck battery in case of overload or short circuit in the wiring of the PA set.

5-5. Battery Charger

(fig. 5-3)

Warning:

When overheated, selenium rectifiers give off poisonous fumes (smell like garlic or rotten eggs) that are harmful to the human body. When the odor is first noticed, shut off the equipment and evacuate the area: *DO NOT* reenter the area until it has been well ventilated. *DO NOT* handle selenium rectifiers that have been overheated (even after cooling) with the bare hands.

a. The battery charger (fig. 1-6) is a stable, filtered, dc voltage power supply adjustable from 0 to 14 volts and 0 to 28 volts for continuous current loads up to 5 amperes and for intermittent loads up to 10 amperes. For continuous operation, the 5-ampere maximum should not be used at output voltages higher than 28 volts. While ac power consumption varies for different loads, the ac power requirement is approximately 265 watts for a 5-ampere, 28-volt load. The selenium rectifiers that provide the dc power are mounted against the sides of the cabinet to provide the most efficient method of heat dissipation.

b. The battery charger operates as follows:

(1) When switch S2 is set to 28V, bridge selenium rectifiers SR1 through SR4 convert the ac applied from transformer T1 to full-wave dc and apply it through a filter network, which consists of L1, L2, C1, and C2, to the output + and - terminals. The filter network provides a dc that has a ripple voltage not more than approximately 1 percent of the output voltage.

(2) When switch S2 is set to 14V, selenium rectifiers SR3 and SR4 are not used. In this situation, the current from transformer T1 is applied through the load and selenium rectifier SR1 for one alteration of the alternating current; then, through the load and selenium rectifier SR2 for the other alteration of the alternating current. Thus, the battery charger is performing as a halfwave rectifier.

(3) When voltage control S3 is rotated toward A, the wiper contacts are moved to the ends of the winding of transformer T1, reducing the voltage pickup from the transformer.

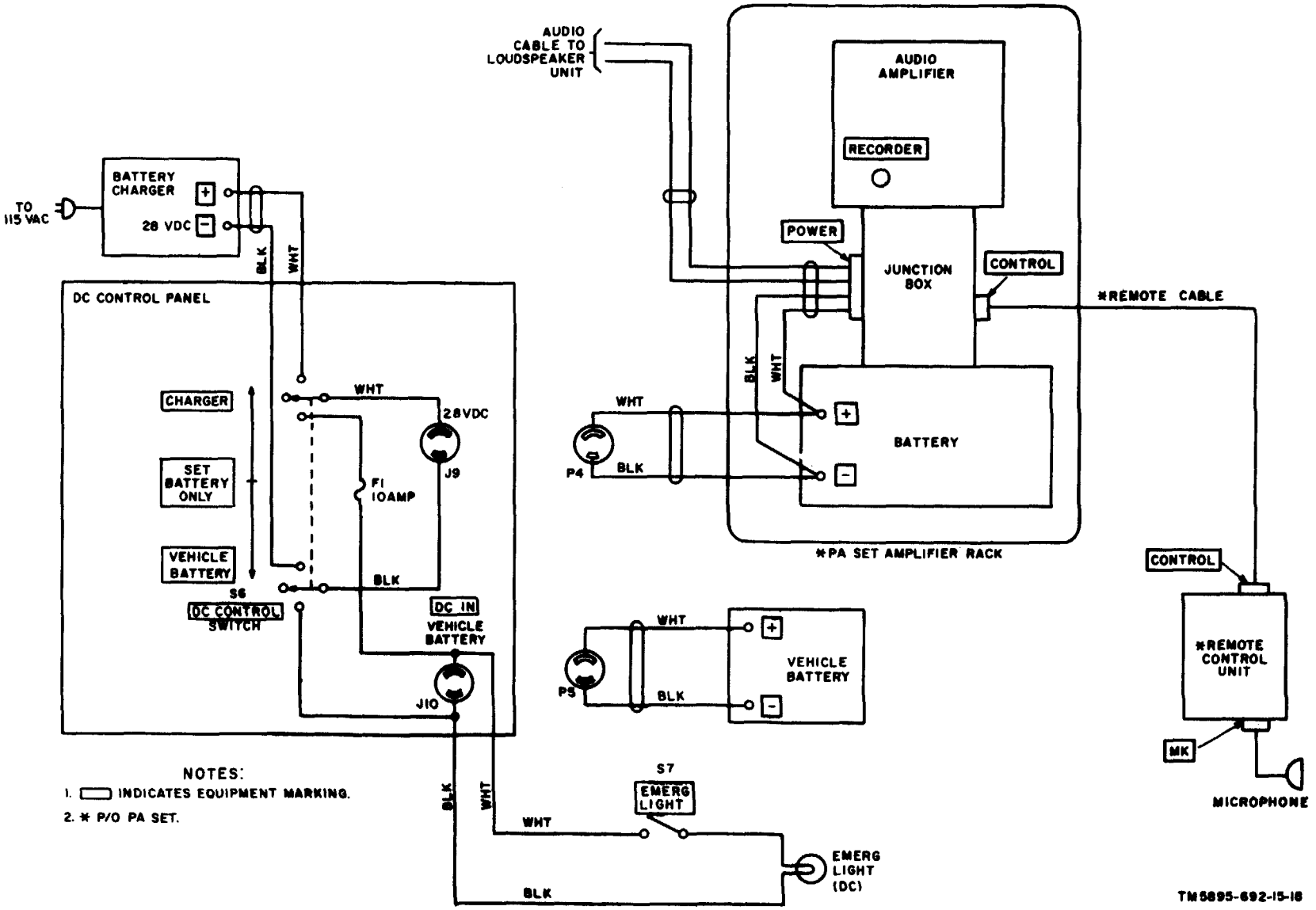


Figure 5-2. Shelter dc power distribution diagram.

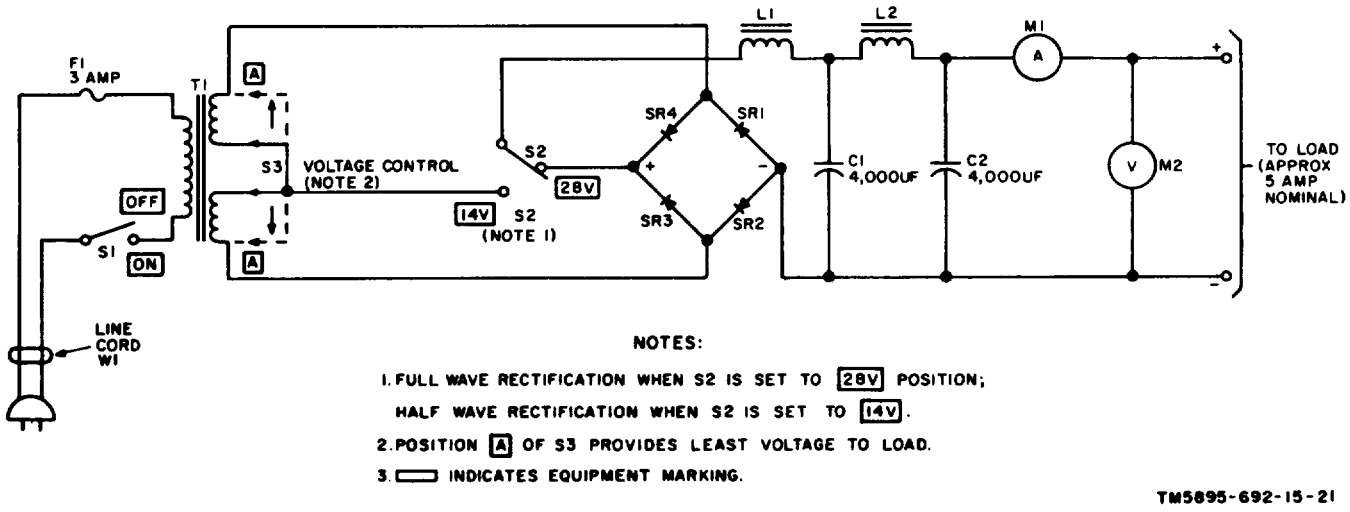


Figure 5-3. Battery charger, schematic diagram

CHAPTER 6

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE

Section I. DIRECT AND GENERAL SUPPORT MAINTENANCE

6-1. General

a. The maintenance of the AN/MSQ-85 components listed in paragraph 5-1*a* is covered in associated technical manuals (app A). The maintenance of the other components of the AN/MSQ-85 is described in paragraphs 6-2 through 6-8.

b. The following test equipment is required:

(1) Multimeter ME-26(*)/U (TM 11-6625-200-12) is used for voltage and resistance measurements on the AN/MSQ-85 components not covered by associated technical manuals. Multimeter ME-26(*)/U represents Multimeters ME-26A/U, ME-26B/U, ME-26C/U, and ME-26D/U.

(2) Multimeter TS-352B/U is used to measure current.

6-2. Shelter Maintenance

Warning:

The 120 volts ac used in the shelter is dangerous. Serious injury or death can occur when the following caution is not observed.

Caution:

To replace any electrical wiring or electrical parts, make sure that all ac power switches are set to OFF and all ac power is disconnected from the shelter.

a. Troubleshooting.

(1) When failure of the movie projector, slide projector, radio, or tape recorder to operate properly is attributed to the shelter ac power circuits, proceed as follows:

(a) Turn on main power circuit breaker switch CB2 or CB3 used in the circuit (Fig. 5-1).

(b) Apply power to the 115-V AC receptacle in the power entrance box. Use the ME-26(*)/U to measure the ac voltage at the ac outlets and at the power distribution panel.

(c) Replace defective components or wiring. In replacing the wiring, be careful to use the same gage wire. Observe the color of the removed wires and their position on the equipment; replace them with the same color wires and connect them to the original points.

(2) When failure of the fans, heater, lighting, or buzzer for the slide projector to operate properly is attributed to defects in the circuit breaker switch CB1 circuit, perform the operations suggested in (1) above. Note the voltage at receptacle J3 for the buzzer cable is approximately 8 volts. For the fluorescent lights, replace the fluorescent lamp and starter before troubleshooting the fixture.

(3) Remove and replace the circuit breaker in the power distribution panel as follows:

(a) Remove the screws that secure the cover to the power distribution panel and remove the cover.

(b) Grasp the defective circuit breaker and pull it straight out from the panel.

(c) Note the color of the wires connected to the circuit breaker and their point of connection. Disconnect the wires from the circuit breaker.

(d) Connect the wires to the appropriate terminals of the replacement circuit breaker.

(e) Position the circuit breaker in the power distribution panel and firmly press the circuit breaker in place.

(f) Replace the power distribution panel cover.

(4) Repair of the shelter framework and shelving includes the following:

(a) Emergency repairs of holes and minor structural damage to the shelter.

(b) Removal and replacement of authorized maintenance parts (app D).

(c) Refer to TB SIG 354 for information on the maintenance of the shelter.

6-3. Battery Charger Maintenance

The battery charger is a filtered dc power supply used in the audio-visual unit as a constant-voltage battery charger for the nickel-cadmium battery in the PA set.

a. Refer to paragraph 5-5 and figure 5-3 for circuit performance of the battery charger.

Warning:

When overheated, selenium rectifiers give off poisonous fumes (smell like garlic or rotten eggs) that are harmful to the human body. When odor is first noticed, shut off equipment and evacuate area. *DO NOT* reenter area until it has been well ventilated. *DO NOT* handle selenium rectifiers that have been overheated (even after cooling) with bare hands.

b. Refer to appendix D for authorized replacement parts. In replacing the selenium rectifiers, make sure that they are securely tightened to the framework.

c. Test the battery charger, before repair and after repair, as follows:

(1) Check the voltmeter indication as follows:

(a) Set the battery charger switch to OFF and connect a 25-ohm, 2,500-watt potentiometer to the + and - output terminals on the battery charger.

(b) Set the battery charger 14V-28V switch to 14V, the voltage control to A, and the power switch to ON.

(c) Connect the ME-26(*)/U, adjusted to measure dc volts, to the plus and minus output terminals of battery charger.

(d) Adjust the battery charger output control from A to fully clockwise, while observing the voltage indication on both the battery charger and the ME-26(*)/U. The indications obtained on the battery charger voltmeter should be within 5 percent of the voltage indication obtained on the ME-26(*)/U.

(2) Check the ammeter indications, as follows:

(a) Connect the battery charger to an ac power source.

(b) Use Multimeter TS-352B/U, adjusted to measure at least 50 milliamperes (ma). Connect the TS-352B/U in series with a 1,000-ohm resistor to the plus and minus output terminals of the battery terminals of the battery charger. The battery charger ammeter and TS-352B/U current indications should be within 5 percent of each other.

6-4. Nickel-Cadmium Battery Maintenance

Maintenance information in TM 11-6140-203-12 and TM 11-6140-203-35 applies to the nickel-cadmium batteries used in the PA set and the tape recorder. Refer to paragraph 3-12*b*(3) for instructions on using the battery charger to charge the PA set nickel-cadmium battery.

6-5. Large and Small Screens

a. Screen Projector BM-10A. The BM-10A is a small tripod-held projection screen. No repair parts are provided. Local straightening, or some welding, of the framework may be performed. The criteria for repair, or return to depot maintenance for repair, is given in SB 11-584.

b. Screen, Projection BM-22A. The BM-22A is similar to Screen, Projection on PH-556/GF.

Repair of the framework can be accomplished by straightening and welding as required.

c. BM-22A Kit. Repair the BM-22A kit by straightening and welding it as required.

6-6. Painting and Moisture-Fungi-Corrosion-proofing

Refer to TB SIG 364 for instructions on painting and preserving the equipment.

6-7. Recorder-Reproducer Set, Sound AN/UNH-10

Refer to TM 11-5874-200-12 and TM 11-5874-200-45 for AN/UNH-10 maintenance. The following maintenance items are also applicable.

a. Check the battery compartment for spilled electrolyte. Clean the compartment with caustic soda.

b. Clean the record and playback heads and the capstan and puck. Use a cotton swab dampened with alcohol.

c. Use light oil (FED VV-L-800) on the moving parts (para 4-2*b*).

d. Use a rust preventive and rust remover on all exposed metal parts.

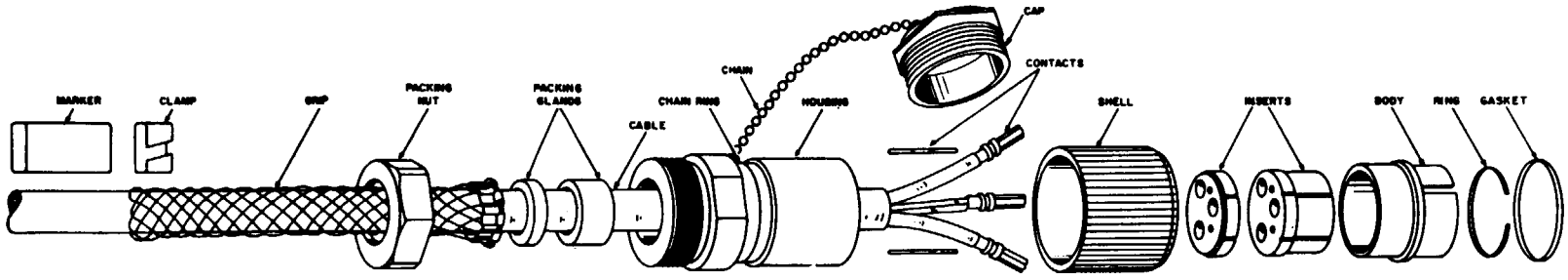
e. Use low-pressure air to remove dust and dirt in hard-to-reach areas.

f. To reduce buzzing or humming on the recordings, unplug the electric fans that are near the tape recorder. The noise usually comes from the fans that are connected to the same electrical line.

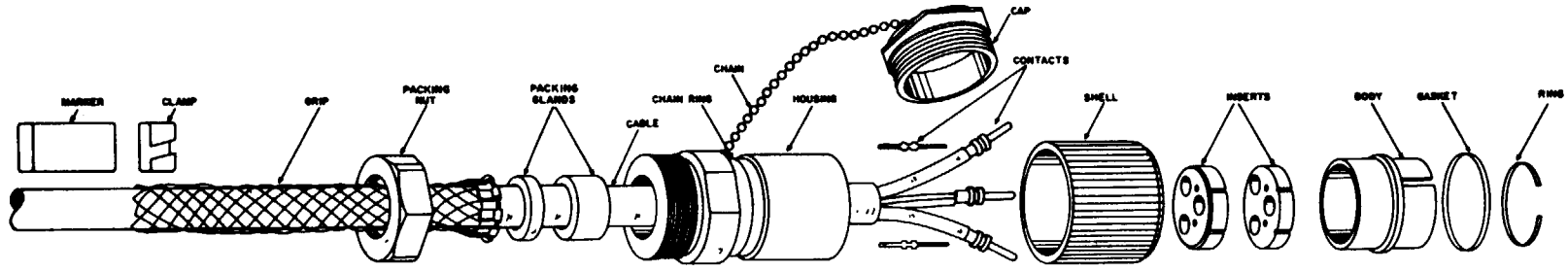
6-8. Power Cable Repair

(fig. 6-1)

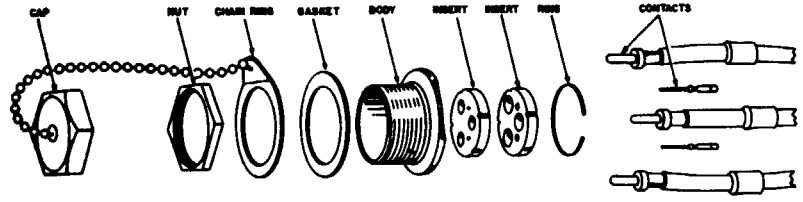
To replace the connectors on the power cable, refer to A or B, figure 6-1 for the proper location of the parts on the connectors. Refer to C, figure 6-1 for the proper location of the parts for the ac power receptacle in the power entrance box of the shelter.



A. POWER CABLE CONNECTOR (FEMALE)



B. POWER CABLE CONNECTOR (MALE)



TM5895-692-15-36

C. POWER RECEPTACLE (MALE)

Figure 6-1. Power cable and power receptacle repair details.

Section II. DEPOT MAINTENANCE

6-9. General

Depot Maintenance Depot maintenance of the AN/MSQ-85 includes major repair and overhaul of the equipment in the shelter, the shelter, and the truck. Refer to the technical manuals associated with the equipment (app A).

6-10. Depot Overhaul Standards

Refer to the applicable technical manuals (app A) for individual equipment components for depot overhaul standards and procedures. For components of the AN/MSQ-85 not covered by depot overhaul standards, use the following general procedures.

a. Applicable procedures of the depots for performing depot overhaul tests and general standards for repaired electronic equipment are given in TB SIG 355-1, TB SIG 355-2, and TB SIG 355-3.

b. Perform all modification work orders applicable to the equipment. DA Pam 3107 lists all applicable MWO's.

c. Check all cables, cords, and wiring for continuity and insulation resistance.

d. Check the items listed below, and similar items, for condition of the welding, missing bolts, nuts, and washers, distortion of frameworks and joints, tears and fraying, condition of painted surfaces, and other applicable conditions that indicate weakness in the equipment; replace or repair equipment as applicable.

(1) Screen, Projection BM-22A.
(2) BM-22A kit.
(3) Small screen.
(4) Chairs.
(5) Ground rod.
(6) Sun tarpaulin.
(7) Straps and webbing.
(8) Block and tackle.
(9) Stretchable cords around shelves in shelter.
(10) Projector stand.
(11) Floodlights.
(12) Sling assembly bracket on truck fender.
(13) Gas can racks and pioneer tool rack.
(14) Loudspeaker rack on front of shelter.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

7-1. General

Mobile Audio Visual Unit AN/MSQ-85 includes the truck; the shelter, with all the audio and visual equipment in it and the power unit (appx B). To prepare the AN/MSQ-85 for shipment and limited storage, use the procedures given in paragraph 7-2.

7-2. Packaging and Packing for Shipment or Limited Storage

a. Inventory. Refer to appendix B and check to see that all the AN/MSQ-85 components are on hand. Also refer to paragraph 2-1*a* and *b* for other items used with the AN/MSQ-85.

b. Stowage. Check the equipment for secure stowage (para 3-3). Make sure that all equipment power switches are off and the equipment is clean.

c. Packaging and Packing.

(1) When the truck is to be stored or shipped concurrently with the shelter, prepare the truck for either situation according to current shipping or storing procedures.

(2) When the truck is not to be shipped or stored with the shelter, a pioneer tool rack must be obtained and mounted on the truck tailgate as a substitute for the pioneer tool rack that must remain on the gas can rack.

(3) Use the procedures given in paragraph 3-4 to lift the shelter onto or off of the truck, as applicable.

(4) Remove the battery cells from the flashlight and the telephone.

(5) Remove all gas cans from the equipment; gas cans should not be stored with the equipment unless they are clean, with no evidence of fuel fumes in them.

(6) Remove the fuel from the power unit. Stow the projector stand, the power unit, and the power cables inside the shelter (fig. 3-3).

(7) Remove the items listed in *(a), (b),* and *(c)* below from outside the shelter and stow them inside the shelter. Replace and securely tighten all the bolts and washers (used to hold the removed part) in their place in the shelter wall.

(a) On the front of the shelter (figs. 1-1 and 1-3) remove the bracket for the AB-15/GR (leave the AB-15/GR in the bracket); the PA set loudspeaker, the loudspeaker mount with the long plate attached; the U frame that holds the loudspeaker; and the canvas cover.

(b) At the rear of the shelter (figs. 1-2, 1-9, and 3-6), remove the lifting boom, the heater gas can rack, the gas can adapter with the fuel line and the tube for the gas can adapter; and the rack for the three gas cans (the rack for the truck pioneer tools is attached to this rack).

(c) From underneath the shelter (fig. 3-4), remove the ground rod and the sun tarpaulin.

(8) Stow the items removed from the outside of the shelter ((7) above) except the rack for the three gas cans, inside the shelter. Use cardboard cartons to pack some of the items, and securely tie the other items so that they will not damage other components during transit.

(9) Recheck all items in the shelter shelves and on the floor of the shelter for tightness of all fasteners.

(10) Mount the rack for the three gas cans at the back of the shelter. Lock the shelter door.

Section II. DEMOLITION OF MATERIAL TO PREVENT ENEMY USE

7-3. Authority for Demolition

Demolition of equipment will be accomplished only on the order of the commander. The destruction procedures given in paragraph 7-4 will be used to prevent further use of the equipment.

7-4. Methods of Destruction

Use any of the methods given below to destroy the equipment.

a. Smash. Smash optical lenses, bulbs, cases, controls, switches, power unit engine and generator parts; and use sledge hammers, axes, handaxes, or crowbars.

b. Cut. Cut power cables, power wiring, and cabling; use axes, handaxes, or machetes.

Warning:

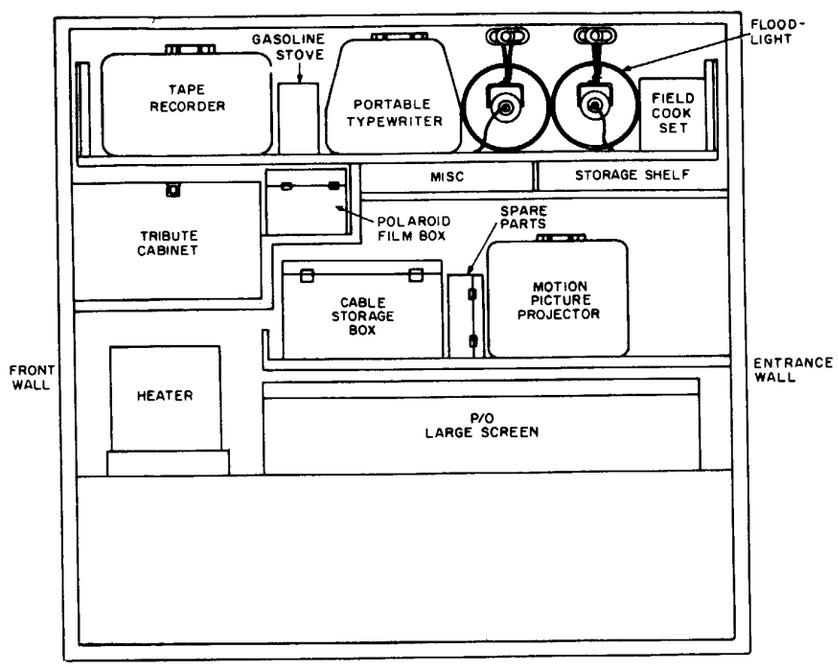
Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

c. Burn. Burn the cabling, shelter, and technical manuals; use kerosene, oil, flame-throwers, or incendiary grenades.

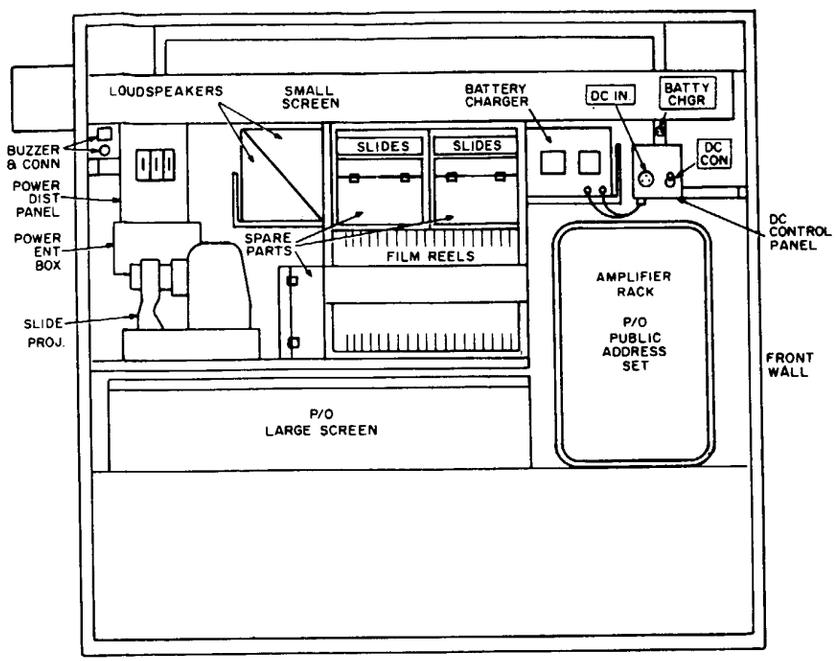
d. Bend. Bend the equipment framework.

e. Explode. If explosives are necessary, use firearms, grenades, or TNT.

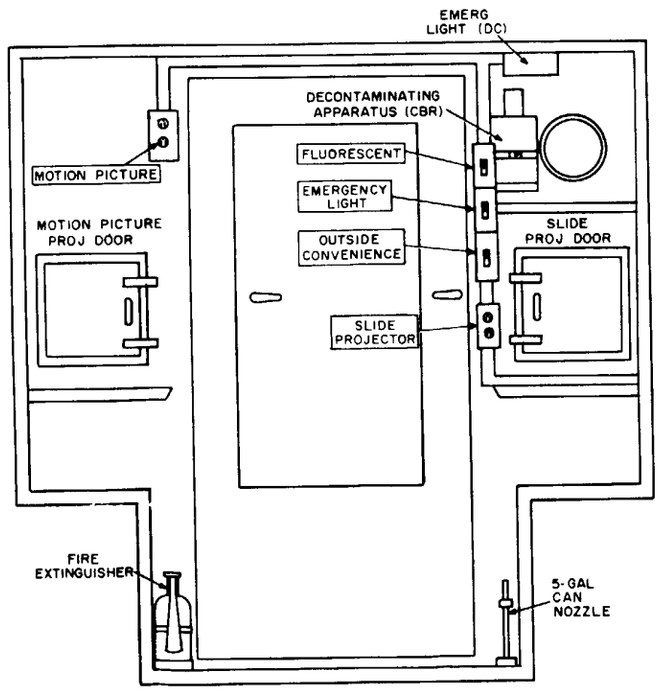
f. Dispose. Bury or scatter the destroyed parts in slit trenches or foxholes, or throw them into nearby streams.



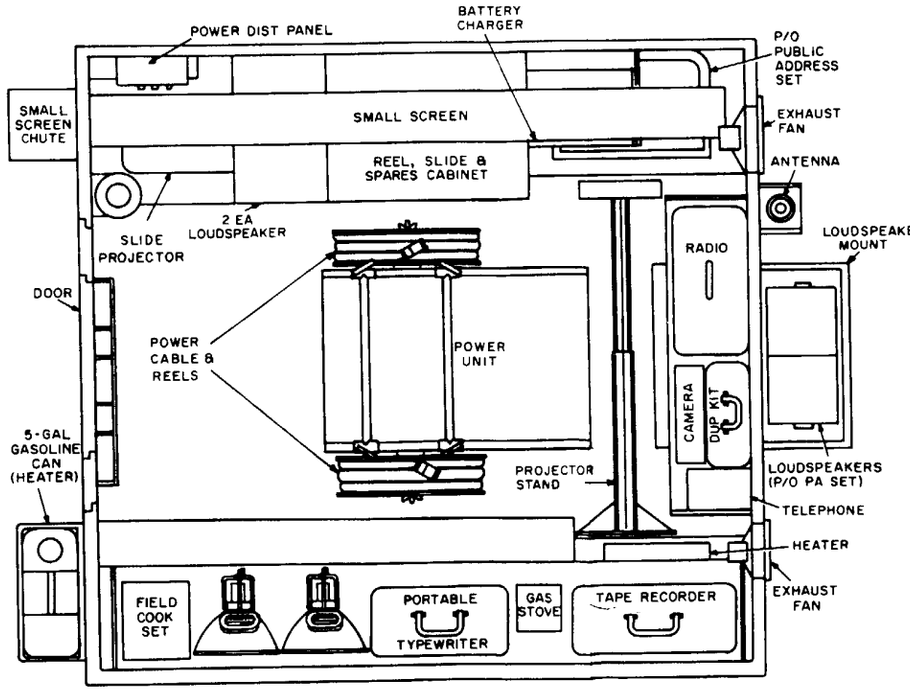
A. CURBSIDE WALL EQUIPMENT



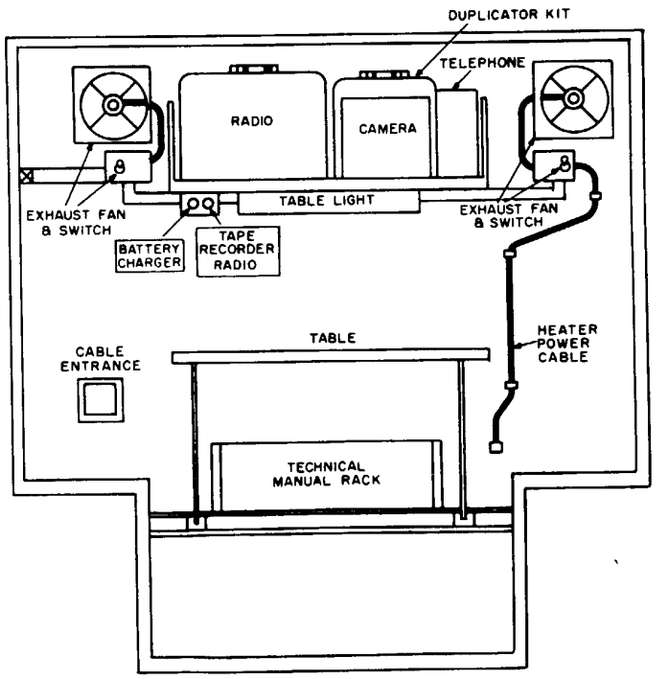
B. ROADSIDE WALL EQUIPMENT



C. ENTRANCE WALL



D. FLOOR PLAN



E. FRONT WALL EQUIPMENT

TM5895-692-15-20

Figure 7-1. Floor plan and wall elevations.

APPENDIX A

REFERENCES

Following is a list of publications applicable to the operator, organizational, DS, GS, and depot maintenance personnel of Mobile Audio Visual Unit AN/MSQ-85.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
SB 11-584	Photographic Projection Screens BM-10A and BM-23.
TB SIG 291	Safety Measures to be Observed when Installing and Using Whip Antennas, Field Type Masts, Towers, Antennas, and Metal Poles that Are Used with Communication, Radar, and Direction Finder Equipment.
TB SIG 354	Maintenance and Repair Procedures for S-141/G-, S-144/G-, S-280/G-, S-318/GType Shelters.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 3230-204-15	Operator and Organizational Maintenance Manual (Including Repair Parts and Special Tool Lists): Decontaminating Apparatus, Portable, DS2,1 1/2 Quart, ABC-Mil.
TM 5-2805-203-14	Organizational, DS, and GS Maintenance Manual: Engine Gasoline: Military Standard Models (Models 4A032-1) FSN 2805-776-0483 and (Model 4A032-11) FSN 2805-068-7512.
TM 5-4520-206-15	Operator, Organizational, Field and Depot Maintenance Manual: Heater, Duct Type, Portable, Diesel and Gasoline, 15,000 BTU; Electric Driven Blower; Dc, 24 V (Hunter Model UH-48 DC), Serial Number Range 1101 through 1694. Serial Number Range 1101 through 1694, FSN 4520-709-9224.
TM 5-6115-271-15	Organizational, DS, GS, and Depot Maintenance Manual: Generator Set Gasoline Engine, 3 Kw (Less Engine) 3Kw, Ac, 400 Cycle (Military Model HF 3.0 MD) FSN 6115-075-1638 and FSN 6115-012-1993, 3 Kw, Ac, 60 Cycle (Military Model SF 3.0 MD) FSN 6115-075-1640 and FSN 6115-913-9290. 3 Kw, Dc, 28V (Military Model Dc 3.0 MD/28) FSN 6115-412-1997.
TM 9-8030	Operation and Organizational Maintenance: Truck, Ambulance: 3/4 Ton, 4x4, M43 and M43B1; Truck, Cargo: 3/4-Ton 4x4, M37 and M37B1; Truck, Chassis: 3/4 Ton 4x4, M53B1, M56, M56B1 and M56C; Truck, Maintenance: 3/4 Ton, 4x4, M201 and M201B1 (Signal Corps Model V41/GT).
TM 11-877	Radio Receiver R-520/URR and R-20A/URR.
TM 11-5805-201-12	Organizational Maintenance Manual: Telephone Set TA-812/PT.
TM 11-2332-10	Operator's Manual: Projector PH-222-C and Projector, Still Picture AP9(1).

TM 11-2332-20	Organizational Maintenance Manual: Projector PH-222C and Projector, Still Picture AP-9(1).
TM 11-2332-35	DS, GS, and Depot Maintenance Manual: Projector PH-222-C and Projector, Still Picture AP-9(1).
TM 11-2336	Screens PH-555/GF, PH-555A/GF, and PH-556/GF.
TM 5410-212-15P	Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Shelter, Electrical Equipment S-318/G.
TM 11-5820-369-20P	Organizational Maintenance Repair Parts and Special Tool Lists: Receivers, Radio R-520/URR and R-520A/URR.
TM 11-5820-369-35P	DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Receivers, Radio R-520/URR and R-520A/URR.
TM 11-5830-240-15	Organizational, DS, GS, and Depot Maintenance Manual: Public Address Set AN/UIH-5.
TM 11-5830-240-35P	DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Public Address Set AN/UIH-5.
TM 11-5874-200-12	Operator and Organizational Maintenance Manual: Recorder-Reproducer Set, Sound AN/UNH-10.
TM 11-5874-200-25P	Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists. Recorder-Reproducer Set, Sound AN/UNH-10.
TM 11-5874-20045	GS and Depot Maintenance Manual: Recorder-Reproducer Set, Sound AN/ UNH-10.
TM 11-6140-203-12	Operator and Organizational Maintenance Manual: Nickel-Cadmium Storage Batteries.
TM 11-6140-203-35	Field and Depot Maintenance Manual: Nickel-Cadmium Storage Batteries.
TM 11-6625-200-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual: Multimeters ME-26A/U, ME-26B/U, ME-26C/U, and ME-26D/U.
TM 11-6720-234-15	Operator, Organizational, DS, GS, and Depot Maintenance Manual: Camera Set, Still Picture, Polaroid Model 100.
TM 11-6720-239-12	Operator and Organizational Maintenance Manual: Camera Set, Still Picture KS-101A.
TM 11-6730-203-35P	Field and Depot Maintenance Repair Parts and Special Tools List: Projector, Still Picture AP-9(1) and Projector PH-222C.
TM 11-6730-210-20	Organizational Maintenance Manual: Projection Set, Motion Picture, Sound AS-7A.
TM 11-6730-210-20P	Organizational Maintenance Repair Parts and Special Tools- List: Projection Set, Motion Picture Sound AS-7A.
TM 11-6730-210-35	DS, GS, and Depot Maintenance Manual: Projection Set, Motion Picture, Sound AS-7A.
TM 11-6730-210-35P	Field and Depot Maintenance Repair Parts and Special Tools List: Projection Set, Motion Picture, Sound AS-7A.
TM 38750	Army Equipment Record Procedures.

APPENDIX B

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

3-1. Scope

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Mobile Audio Visual Unit AN/MSQ-85.

3-2. General

The basic issue items list (Section II) is a list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

3-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Illustration. This column is divided as follows:

(1) *Figure Number*. Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number*. Not applicable.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

e. Description. Indicates the Federal item name and a minimum description required to identify the item.

f. Unit of Measure (U/M). Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea, in., pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

g. Quantity Furnished with Equipment (Basic Issue Items Only). Indicates the quantity of the basic issue item furnished with the equipment.

Section II. BASIC ISSUE ITEMS LIST

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)
(A) FIG. NO.	(B) ITEM NO.	FEDERAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION USABLE ON CODE	UNIT OF MEAS	QTY FURN WITH EQUIP
1-4		4210-223-9912		99539	FIRE EXTINGUISHER MIL81349 TYPE 1, C11, FF5	EA	1
		5120-251-4489	GGGH-0086	81348	HAMMER, SLEDGE	EA	1
		5975-224-5260	MX148/G	80063	ROD GROUND	EA	1

APPENDIX C
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations for AN/MSQ85. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Function

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.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical 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, preserve, drain, paint, or to replenish fuel/ lubricants/hydraulic fluids or compressed air supplies.

d. Adjust. Maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to 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 the comparison 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. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

h. Replace. The act of substituting a serviceable like-type part, subassembly, model (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module/component/ assembly, end item or system. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. That periodic maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g. DMWR) in appropriate technical publications. 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.

C-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level 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 vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of man-hours specified by the "worktime" 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 operating conditions. This time includes preparation time, troubleshooting 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. Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

C-4. Tool and Test Equipment Requirements (Table 1)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC.
The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5digit) in parentheses.

SECTION II MAINTENANCE ALLOCATION CHART FOR MOBILE AUDIO VISUAL UNIT AN/MSQ-85

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category C	O	F	H	D	(5) Tools and Equipment
00	MOBILE AUDIO VISUAL UNIT AN/MSQ-85	Inspect	0.3					
		Test		1.0				1.2
		Service		15.0				1,2
		Repair		2.0				1,2
01	BATTERY - SONOTONE (NICAD 26480)	Inspect	0.1					
		Test			0.5			3,4,5
		Service		0.1				2
		Repair			0.5			3,4.5
02	BATTERY CHARGER	Inspect	0.1					
	(ELECTRO PRODUCTS LAB MODEL EF)	Service		0.1				2
		Test			0.2			3,4,5
		Repair			0.5			3,4,5
03	SHELTER S-318/G(MOD) (SEE TM 11-5410-212-15P)							
04	STILL PICTURE, PROJECTOR AP-9(1) (SEE TM 11-2332-20)							
05	DECONTATINATING APPARATURE, PORTABLE DS2, 1-1/2 QUART, ABC-M11 (SEE TM 3-4230-204-13)							
06	RECORDER-REPRODUCER SET AN/UNH-10 (SEE TM 11-5874-200-12)							
07	RADIO RECEIVER R-520/URR (SEE TM 11-877)							
08	PROJECTOR, MOTION PICTUFE SOUND AQ-4A(1) (SEE TM 11-6730-210-20)							
09	PUBLIC ADDRESS SET AN/U1H-5 (SEE TM 11-5830-240-15)							
10	GENERATOR SET, GAS ENGINE 3KW, 60HZ (SEE TM 5-6115-271-14)							
11	ENGINE, GAS CHP MODELS 4A032-1 AND 4A032-11 (SEE TM 5-2805-203-14)							
12	CAMERA SET, STILL PICTURE KS-101A (POLAROID 250) (SEE TM 11-6720-239-12)							
13	HEATER, SPACE, NON ELECTRIC UH-48 (SEE TM 5-4520-232-14)							
14	TRUCK, 3/4-TON M-3781 (WITH WINCH) (SEE TM 9-8031-2)							
15	TELEPHONE SET TA-312/PT (SEE TM 11-5805-201-12)							
16	SCREEN, PROJECTION BM-22A	Inspect		0.1				
		Repair		1.0				
17	FIRE EXTINGUISHER MIL81349 TYPE 1, C11, FF5 (SEE TM 5-687)							

(1) Includes charging all batteries.

SECTION II MAINTENANCE ALLOCATION CHART FOR MOBILE AUDIO VISUAL UNIT AN/MSQ85

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment
			C	O	F	H	D	
18	CABLE ASSY (SC-C-622029)	Inspect	0.1					
19	CABLE ASSY (SC-C-622028)	Test			0.2			3,4,5
20	CABLE ASSY (SC-C-622026)	Repair			0.5			3,4,5
21	CABLE ASSY (SC-C-622025)							
22	CABLE ASSY (SC-C-622031)							
23	CABLE ASSY, SPECIAL PURPOSE (SC-C-622024)							
24	CABLE ASSY, SPECIAL PURPOSE (SC-C-622030)							
25	EXTENSION CORD (SC-C-622027)							
26	EXTENSION CORD (SC-C-622032)							
27	BM-22A KIT	Inspect	0.1					
		Repair		0.1				3,4
28	TYPEWRITER (NSN 7430-00-254-4319) (SEE HANDBOOK SUPPLIED WITH TYPEWRITER)							

TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MOBILE AUDIO VISA UNIT AN/MSQ-85

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	O	MULTIMETER AN/URM-105	6625-00-581-2036	
2	O	TOOK KIT TK-101/GSQ	5180-00-064-5178	
3	F,H.D	TOOK KIT TK-100/G	5180-00-605-0079	
4	F,H,D	TOOL KIT TK-105/G	5180-00-610-8177	
5	F,H,D	MULTIMETER ME-26/U	6625-00-360-2493	

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, *United States Army,*
Chief of Staff.

Official:
KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
Dir of Trans (1)
CofEngra (1)
TSG (1)
CofSpts (1)
ACSC-E (2)
USAMB (10)
USAARENBD (2)
USACDCCEA (1)
USACDCCEA Ft Huachuca (1)
USCONARC (2)
USAMC (2)
USAMICON (2)
USAECOM (2)
ARADCOM (2)
ARADCOM Rgn (1)
OS Maj Comd (2)
USACDCEC (10)
USASTRATCOM (2)
USAESC (70)
USATECOM (2)
Armies (1)
Svc Colleges (1)
USASCS (40)
USAINTS (5)
USASWS (20)
Fort Huachuca (5)
Fort Carson (7)
WSMR (2)
Army Depots (1) except
- LBAD (14)
- SAAD (30)
- TOAD (20)
- LEAD (7)
- ATAD (5)

Gen Dep (Pac) (1)
Sig Sec Gen Dep (Pac) (4)
Sig Dep (Pac) (6)
Sig FLDMS (Pac) (2)
USAERDAA (2)
USAERDAW (2)
USACREEL (2)
1st Cav Div (2)
Psycho Gp (10)
Psycho Bn (10)
Psycho Co (6)
Units org under fol TOE:
(1 copy each)
11-155
11-157
11-158
11-687
11-592
11-497
29-34

NG: State AG (8).

USAR: None.

For explanation of abbreviations used, see AR 320-50.

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P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

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 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 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 milliters = .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

PIN: 014748-000