TM 11-5895-372-10

TECHNICAL MANUAL

OPERATOR'S MANUAL
FOR
COUNTERMEASURES SET AN/TLQ-15
(NSN 5865-00-878-2650)

This copy is a reprint which Includes current pages from Changes 1 through 5.

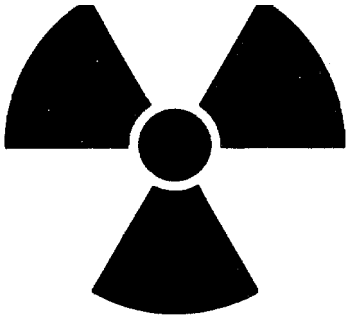
HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1976

WARNING

Before operating the AN/TLQ-15, be sure all requirements of TB SIG 291 are met. Injury or DEATH could result from improper or careless operation.

RF RADIATION HAZARD



RADIOACTIVITY HAZARD

STD- RW-2

Dangerous RF power exists in and around the cm antenna and counterpoise during operation. Do not operate the AN/TLQ-15 with personnel in contact with or in close proximity to these components. Before attempting any adjustment or disassembly of the cm antenna or counterpoise, power should be removed from the equipment.

HIGH VOLTAGE
is used in the operation of the AN/TLQ-15

DEATH ON CONTACT
may result if personnel fail to observe safety precautions. Learn the areas containing high voltage in each piece of equipment. Be careful not to contact high-voltage connections when installing or operating this equipment.

Before working inside the equipment, turn power off and ground points of high potential before touching them.

CHANGE
NO. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *10 August 1983*

Operator's Manual
For
COUNTERMEASURES SET AN/TLQ-15
(NSN 5865-00-878-2650)

TM 11-5895-372-10, 14 May 1976 is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the new page.

2. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

Remove pages	*Insert pages*
3-1 through 3-4	3-1 through 3-4
Index 1 and Index 2	Index 1 and Index 2

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

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with Special List.

CHANGE
NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 4 January 1983

Operator's Manual
COUNTERMEASURES SET AN/TLQ-15
(NSN 5865-00-878-2650)

TM 11-5895-372-10, 14 May 1976, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin' of the page.

2. Added or revised illustrations are indicated by a vertical bar in front of the figure caption and by a pointing hand on the illustration.

3. Remove and insert pages as indicated below:

Remove Pages	*Insert Pages*
a	a and b
1-1 through 1-4	1-1 through 1-4.1
1-11 through 1-14	1- 11 through 1-14
2-29 and 2-30	2-29 and 2-30
2-39 through 2-44	2-39 through 2-44.1
A-1 and A-2	A-1 and A-2
B-1 through B-4	B-1 through B-4

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

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:
ROBERT M. JOYCE
Major General United States Army
The Adjutant General

Distribution:

To be distributed in accordance with Special Mailing List.

WARNING

READ AND OBSERVE ALL WARNINGS AT BEGINNING OF THIS MANUAL

A REVIEW OF TB 385-4, SAFETY PRECAUTIONS FOR MAINTENANCE OF ELECTRICAL/ELECTRONIC EQUIPMENT, IS RECOMMENDED.

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

5 **DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL**

1

2 **IF POSSIBLE, TURN OFF THE ELECTRICAL POWER**

3 **IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL**

4 **SEND FOR HELP AS SOON AS POSSIBLE**

5 **AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION**

WARNING

VENTILATION IS ESSENTIAL

To prevent asphyxiation the shelter must be ventilated at all times when occupied.

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame. The products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

TECHNICAL MANUAL
No. 11-5895-372-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *14 May 1976*

OPERATOR'S MANUAL
COUNTERMEASURES SET AN/TLQ-15
(NSN S865-00-878-2650)

LIST OF ILLUSTRATIONS

LIST OF TABLES

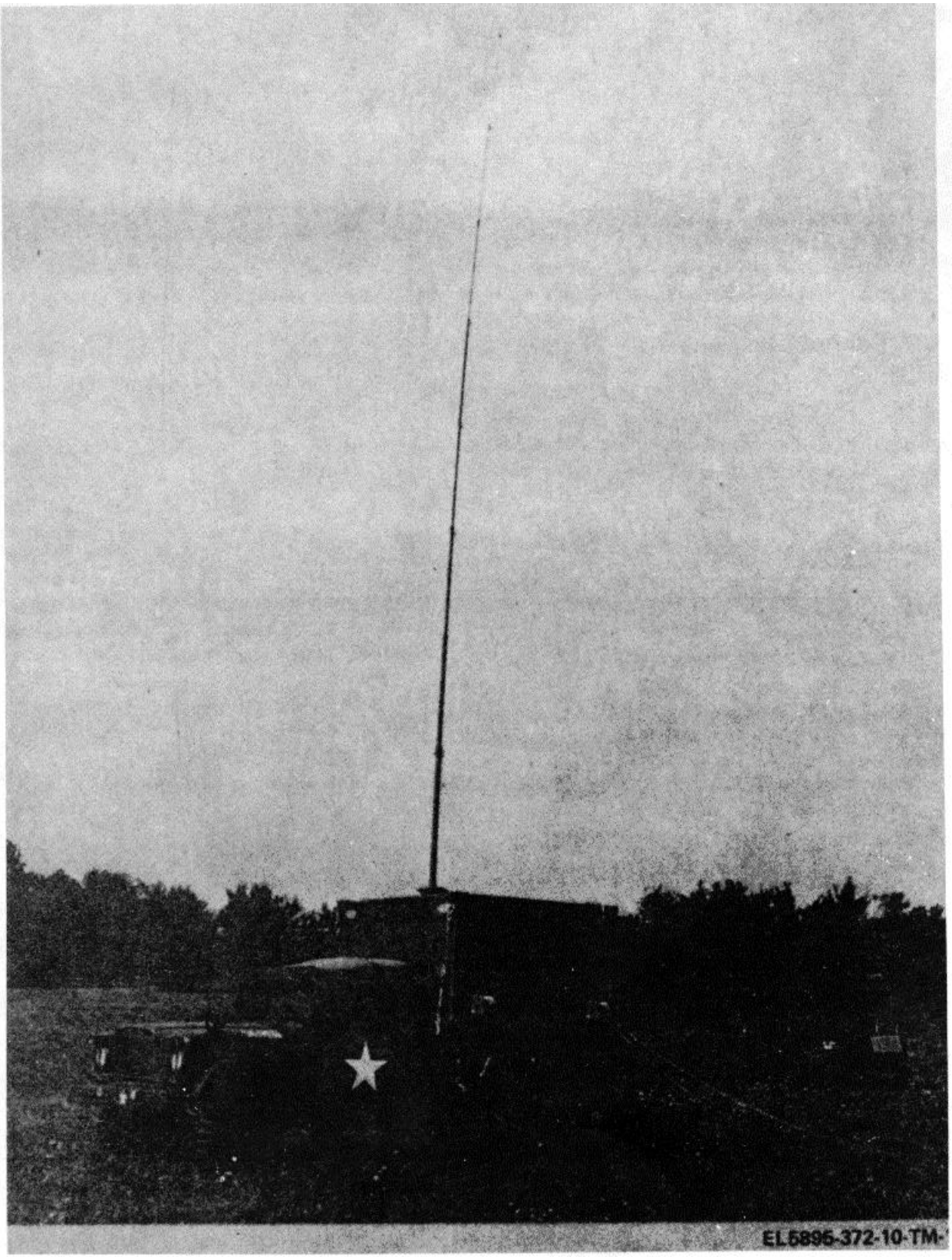


Figure 1-1. Countermeasures Set AN/TLQ-15.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Countermeasures Set AN/TLQ-15 (fig. 1-1) and covers its operation and operator's maintenance. It includes operation under usual and unusual conditions, cleaning and inspection of the equipment and replacement of parts available for operator maintenance.

b. The components of end item list (COEIL) for Countermeasures Set AN/TLQ-15 appears in appendix B.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new additions, changes or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms an procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINS 43655.73/AFR 400-64/MCO 4430.3E.

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 4610.33B/AFR 75-18/MCO 4610.19C/DLAR 4500.15.

1-4. Reporting Errors and Recommending Improvements

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DR-SEL-ME-MP, Fort Monmouth, NJ 07703. In either case, a reply will be furnished direct to you.

1-4.1. Reporting Equipment Improvement Recommendations (EIR)

If your Countermeasures Set AN/TLQ-15 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, NJ 07703. We'll send you a reply.

1-5. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. Administrative Storage and Disposition Instructions

a. Electronic equipment should be stored in accordance with Administrative Storage of Equipment (TM 740-901).

b. This equipment will not be disposed of in accordance with standard procedures. A request for disposition of this equipment is required and should be addressed to Commander, US Army Electronics Materiel Readiness Activity, Vint Hill Farms Station, Warrenton, VA 22186.

1-6.1. Hand Receipts

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 11-5895-372-10-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e., COEI, BII, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the US Army Adjutant General Publications Center, Baltimore, MD, in accordance with the procedures in Chapter 3, AR 310-2, and DA Pam 310-10-2.

Table 1-1. AN/TLQ-15 Common Names List

Reference designation	Nomenclature	Common name
Unit 1	Receiver-Transmitter Group, Countermeasures OE-49/TLQ-15	Shelter
1A1	Coupler, Antenna	Hard mounted coupler
A1	Circuit Card Assembly	RF detector card
1A2	Control, Countermeasures Transmitting Set C-6484/TLQ-15	Control unit
A1	Panel Assembly	Front panel
A2	Card Rack Assembly	Card rack
A1	Circuit Card Assembly	Relay card
A2	Circuit Card Assembly	Diode card
A3	Circuit Card Assembly	Audio amplifier and meter monitor card
A4	Circuit Card Assembly	Timing card
A5	Extender Card, Electronic Test	Extender card
A3	Reflectometer Assembly	Reflectometer assembly
A1	Circuit Card Assembly	Meter amplifier and swr sensing card
A2	Circuit Card Assembly	Meter amplifier and power supply card
A4	Lamp, Interrupt Assembly	Lamp interrupt card
A5	Electronic Components Assembly	Keying and audio card
1A3	Amplifier, Radio Frequency AM-4256/TLQ-15	Rfa
A1	Amplifier, Radio Frequency	IPA
A1	Circuit Card Assembly	Ipa detector card
A2	Gear Train Assembly	Gear train assembly
A1	Tape Assembly, Readout	Readout tape assembly
1A4	Receiver-Transmitter, Radio RT-657/TLQ-15	Rt unit
A1	Circuit Card Assembly	Filter 1 card
A2	Circuit Card Assembly	Filter 2 card
A3	Panel Assembly	Front panel
A2	Counter, Electronic, Digital Readout AN/USM-207	Readout counter
A5	Panel	Edge-lit panel
A101	Circuit Card Assembly	Power attenuator card
A102	Circuit Card Assembly	Bandpass filters card
A103	Circuit Card Assembly	Rf power amplifier card
A104	Circuit Card Assembly	Vcxo and mixer card
A105	Circuit Card Assembly	Am. modulator and level control card
A201	Circuit Card Assembly	Timing and reference card
A202	Circuit Card Assembly	Second loop card
A203	Circuit Card Assembly	Afc and loop interface card
A204	Circuit Card Assembly	Main loop card
A205	Circuit Card Assembly	Programmable counter card
A206	Circuit Card Assembly	Meter amplifier card
A207	Circuit Card Assembly	Detection logic card
A208	Circuit Card Assembly	Rt logic card
A209	Circuit Card Assembly	Modulation logic card
A210	Circuit Card Assembly	Sample and hold card
A301	Circuit Card Assembly	Attenuator and amplifier card
A302	Circuit Card Assembly	Audio amplifier card
A303	Circuit Card Assembly	Fm and afc detector card
A304	Circuit Card Assembly	Log amplifier and detector card
A305	Circuit Card Assembly	Ssb and cw detector card
A306	Circuit Card Assembly	Ssb filters card
A307	Circuit Card Assembly	Linear am. detector card
A308	Circuit Card Assembly	Second age amplifier card
A401	Circuit Card Assembly	Bandpass filters card
A402	Circuit Card Assembly	Limiter and attenuator card
A403	Circuit Card Assembly	Rf amplifier and mixer card
A404	Circuit Card Assembly	First if. amplifier and second mixer card
A405	Circuit Card Assembly	Oscillator and amplifier card
A406	Circuit Card Assembly	First age amplifier card
A407	Circuit Card Assembly	Pan if. amplifier card
B1	Fan, Tubeaxial	Fan
FL1	Rilter, Rfi	Rfi filter
PS1	Power Supply	Rt unit power supply
A1	Circuit Card Assembly	Regulator card

Table 1-1. AN/TLQ-15 Common Names List-Continued

Reference designation	Nomenclature	Common name
PS1	Power Supply	RT unit power supply
A1	Circuit Card Assembly	Regulator card
W1-W6	Cable Assembly	Bus bar
1A5	Coupler, Antenna CU-1408/TLQ-15	Soft mounted coupler
A1	Circuit Card Assembly	Diode logic card
A2	Circuit Card Assembly	Metering card
A3	Front Panel and Cam Assembly	Front panel and cam assembly
1A6	Power Supply PP-4253/TLQ-15	LVPS
1A7	Power Supply PP-4254/TLQ-15	HVPS
1A8	Telephone Set TA-312/PT	Telephone
1A9	Counter, Electronic, Digital Readout CP-1053/TLQ-15	Digital counter
W1	Cable Assembly, Radio Frequency	
W2	Cable Assembly, Radio Frequency	
1A10	Key, Telegraph KY-116/U	Key
1A11	Rack, Electrical Equipment	Equipment rack
A1	Control Box, Electrical	Temperature control box
PS1	Power Supply	+28 vdc converter
S1-S5	Switch, Sensitive	Interlock switches
S6, S7	Switch, Thermostatic	Thermostatic switches
1A12	Shelter S-250/G (modified)	Shelter
A1	Light Assembly	Dome light (USA curb-side)
A2	Light Assembly	Dome light (center)
A3	Interconnecting Box	Remote junction box
A4	Light Assembly	Dome light (roadside)
A5	Heater Assembly	Preheater
A6	Light, Ringer ID-1938/U	Ringer light
S1	Switch, Thermostatic	Operator's thermostatic switch (on wall)
S2	Switch, Push	Door interlock switch (outer)
S3	Switch, Push	Door interlock switch (inner)
TB1	Terminal Board	Terminal Board (near door)
TB2	Terminal Board	Terminal Board (near ringer light)
W1	Wiring Harness, Branched	Shelter harness
1A13	Distribution Box J-2534/TLQ-15	Power distribution box
A1	Circuit Card Assembly	Switch/delay/monitor card
A2	Monitor, Power	Power monitor
PS1	Power Supply	Auxiliary +24 vdc converter
1A14	Fan, Ventilating	Personnel fan
1A15	Air Conditioner Assembly	Air conditioner
A1	Air Conditioner	
1A16	Modulator MX-8052/GLQ	Modulation source
1A17	Indicator, Panoramic IP-922/GLQ	Pan indicator
1A18	Enclosure Assembly, T-SEC	T-SEC enclosure
1A19	Heater, Space, Electric HD-887/TLQ-15	Personnel heater
1A20	Control Assembly, Exhaust	Exhaust assembly
B1	Fan, Ventilating, Propeller	Blower
B2	Fan, Ventilating, Propeller	Blower
B3	Actuator, Electrical-Mechanical, Rotary	Actuator
T1	Temperature Element, Resistance	Temperature sensor
T2	Temperature Element, Resistance	Temperature sensor
S1	Switch, Sensitive	Limit switch
S2	Switch, Airflow	Airflow switch
S3	Switch, Airflow	Airflow switch
TB1	Terminal Board	Terminal board
TB2	Terminal Board	Terminal board
1A21	Filter, Assembly, Low Pass F-1300/TLQ-15	Low pass filter
A1	Electronic Components Assembly	Switch assembly
A2	Electronic Components Assembly	Filter 1
A1	Coil Assembly, RF	
A3	Electronic Components Assembly	Filter 2
A4	Electronic Components Assembly	Filter 3
A5	Electronic Components Assembly	Filter 4
A6	Electronic Components Assembly	Filter 5
1A22	Dummy Load DA-396/TLQ-15	Dummy load
1A23	Panel, Power Distribution	RF panel

Table 1-1. AN/TLQ-15 Common Names List

S2	Switch, Airflow	Airflow switch
S3	Switch, Airflow	Airflow switch
TB1	Terminal Board	Terminal board
TB2	Terminal Board	Terminal board
1A21	Filter, Assembly, Low Pass F-1300/TLQ-15	Low pass filter
A1	Electronic Components Assembly	Switch assembly
A2	Electronic Components Assembly	Filter 1
A1	Coil Assembly, RF	
A3	Electronic Components Assembly	Filter 2
A4	Electronic Components Assembly	Filter 3
A5	Electronic Components Assembly	Filter 4
A6	Electronic Components Assembly	Filter 5
1A22	Dummy Load DA-396/TLQ-15	Dummy load
1A23	Panel, Power Distribution	RF panel
1A24	Headset H-251A/U	Cm headset
1A25	Handset H-189/GR	Comm handset
1A26	Microphone M-80/GR	Cm mic
1A27	Drawer Assembly	Drawer
1A28	Shelf, Utility	Utility shelf
1A29	Chair, Folding	Chair
1A30	Fire Extinguisher, CO_2 Type 1 Size 5	Fire extinguisher
1A31	Ash Receiver, Tobacco	Ash tray
1A32	Handset/Headset (Secure) H-338/TLQ-15	Secure comm handset/headset
1A33	Encoder/Decoder KYB-6/T-Sec	Encoder/decoder
1A34	Amplifier, Audio Frequency AM-4949/U	Secure comm mic amplifer
1A35	Amplifier, Loudspeaker AM-4979/GR	Secure comm speaker amplifier
1A36	Loudspeaker LS-454/U	Speaker
1A37	Control Box, Remote C-8156/TLQ-15	Comm control unit
1W1-1W21	Cable assembly Radio Frequency	RF cables
Unit 2	Communication-Power	Trailer
	Generator Group, Trailer	
	Mounted OP-139/TLQ-15	
2A2	Power Unit PU-681/TLQ-15	Generator
2A3	Cabinet, Electrical equipment	AN/VRC-47 enclosure
A3	Detector Assembly, Low Voltage	Low voltage detector
FL1-4	Filter, RFI	RFI Filter
FL5	Filter, Band Pass	Band pass filter
FL6	Filter, High Pass	High pass filter
FL7	Filter, rfi	RFI filter
PS1	Power Supply	+28 vdc power supply
2A4	Antenna AS-1729/VRC	Comm rt antenna
2A5	Case, Spare Parts Storage	Spare parts case
2A6	Antenna AS-1738/TLQ-15	Cm antenna
A1	Antenna, Whip	Whip antenna
A2	Base, Antenna Support	Insulator
2A11	Stake, Guy GP-25	Ground stakes
2A12	Cable Assembly and Reel RL-267/TLQ-15	Main power cable assembly
2A14	Counterpoise, Antenna MX-6727/TLQ-15	Counterpoise set
A1-A4	Counterpoise, Antenna	Counterpoise
A5-A8	Grounding Set, Transmission Line	Grounding set
2A15	Headset H-251/U	Spare cm headset
2A17	Radio Set AM/VRC-47	Comm radio set
	Receiver, Radio R-442/VRC	Comm rcvr
	Receiver-Transmitter, Radio RT-524/VRC	Comm rt unit
	Antenna Assembly	Comm rcv antenna
2A18	Cable Assembly and Reel RL-268/TLQ-15	Comm cable
2A22	Interconnecting Box	Remote telephone junction box
2A23	Cable Assembly, Power, Electrical CX-12532/TLQ-15	Auxiliary power cable
2A24	Suppressor Assembly	Suppressor
Unit 3	Cable Assembly Set, Electrical MX-8879/TLQ-15	Extender cablee

Section II. DESCRIPTION AND DATA

1-8. Purpose and Use

a. Purpose. The AN/TLQ-15 provides a self-contained, transportable, countermeasures capability within the frequency range of 1.5 to 20 MHz. The receiving capability includes four types of am signals in three modes of operation: Search, look-through, and sij. The transmitting capability includes two kw or rf power with seven types of am and fm in three modes of operation. Continuous transmit, look-through and sig. Three communication links are also provided: HF radio, vhf radio and telephone. The telephone link is also used for limited remote control of the counter-measures function.

b. Use. The AN/TLQ-15 consists of a shelter and a trailer which may be transported and operated wherever conditions permit. The shelter is transported on a truck which is not part of the AN/TLQ-15; after site selection and setup, the truck-mounted or on the ground. The items permanently mounted on the trailer remain a part thereof. The radio communications equipment is setup and operated a fixed station in the shelter during normal use. When the shelter is truck-mounted and in motion, the radio communications equipment may be setup and operated as a mobile station from the truck cab. A

field telephone link up to 1 mile from the shelter may be used for two-way unradiated communications and also for remote control of the transmitter.

1-9. Description

All the AN/TLQ-15 equipment is mounted in a shelter and a trailer. The shelter is physically and thermally divided into two compartments: the operator's compartment which provides everything needed to operate the AN/TLQ-15 without leaving the shelter and the equipment compartment which provides the proper ambient temperature conditions necessary for the equipment. The trailer permanently mounts the primary power generator and part of the communications equipment; it also provides storage for items not in use or which are removed from their normal operating position before transit. Extender cables are provided with the AN/TLQ-15 to facilitate testing and troubleshooting procedures. When not in use, the extender cables are placed in a canvas bag and stored on the trailer.

a. Shelter. The shelter is a fully insulated and weather proofed housing for the equipment and operating personnel. The exterior of the shelter is of painted aluminum skin reinforced with structural members and skid rails. Insulation is provided between the exterior skin and the interior wall to provide optimum environmental conditions for personnel and equipment. The exterior of the shelter has provisions for power, signal, telephone, and ground connections. Sliding doors are located curbside and roadside to provide adequate airflow for the equipment cooling/heating/exhaust system. A main entrance door, which has a smaller secondary door centered in it, is located at the rear of the shelter; each door contains an interlock switch which turns off the dome and equipment lights when either is opened. The exterior of the shelter also provides support for the cm antenna and its insulator as well as providing electrically conductive strips which have terminations for the counterpoise. Mounting plates (footman loops) are located on the curbside of the shelter providing means for climbing to the roof to install the cm antenna or lifting sling. A small spring-actuated door, located curbside on the shelter, opens from the interior of the shelter by use of a pull chain; the door contains a switch which actuates the operator's exhaust fan. The exterior of the shelter is also equipped with lifting and towing eyes. The shelter is divided into an equipment compartment and an operator's compartment which are isolated thermally; the equipment compartment is not accessible to the operator. The forward wall of the operator's compartment (fig. 1-2) consists of the equipment rack with units installed plus other peripheral units mounted directly to the shelter. The curbside wall of the operator's compartment (fig. 1-3) mounts the power distribution box, t-sec enclosure, personnel fan, and operator's thermostatic switch; the operator's chair with storage bracket and holddown straps are also mounted on the curbside wall (fig. 1-2). The roadside wall of the operator's compartment (fig. 1-4) mounts the telephone, cm headset, key, fire extinguisher (on floor), ringer light, literature holder, ash tray, and two rifle racks. The rear wall of the operator's compartment mounts the entrance doors and the air-conditioner (fig. 1-4).

(1) Equipment rack (fig. 1-2). The equipment rack supports most of the AN/TLQ-15 units and is designed to accept slide-track mounted units and hard-mounted units which are interconnected by the shelter wiring harness. The equipment rack is shock-mounted and contains interlock switches which are actuated when a unit is withdrawn from its normally secured position. For operator convenience, the equipment rack also has a slide-track mounted utility shelf and storage drawer.

(2) Soft and hard-mounted couplers (fig. 1-2). The coupler is comprised of two major units. The removable unit (soft-mounted) is modular and slide-track mounted. Captive screws secure the unit in its operating position and bow handles are provided for withdrawing the unit for maintenance. Most of the smaller operating components and all of the controls and indicators are contained in the removable unit. Connectors on the rear panel mate with corresponding connectors located in the hard-mounted coupler and on the shelter wiring harness. The nonremovable unit (hard-mounted) contains relays, an antenna loading coil, and the antenna contact assembly.

(3) Control unit (fig. 1-2). The control unit is a modular, removable, slide-track mounted unit which is held in the equipment rack by captive screws. Two bow handles are provided for withdrawing the unit which can then be tilted on the slide tracks for ease of maintenance. All of the controls and indicators appear on the front panel and are illuminated where necessary. The front panel also contains a loudspeaker, a jack for use with the cm headset, and a jack for external audio

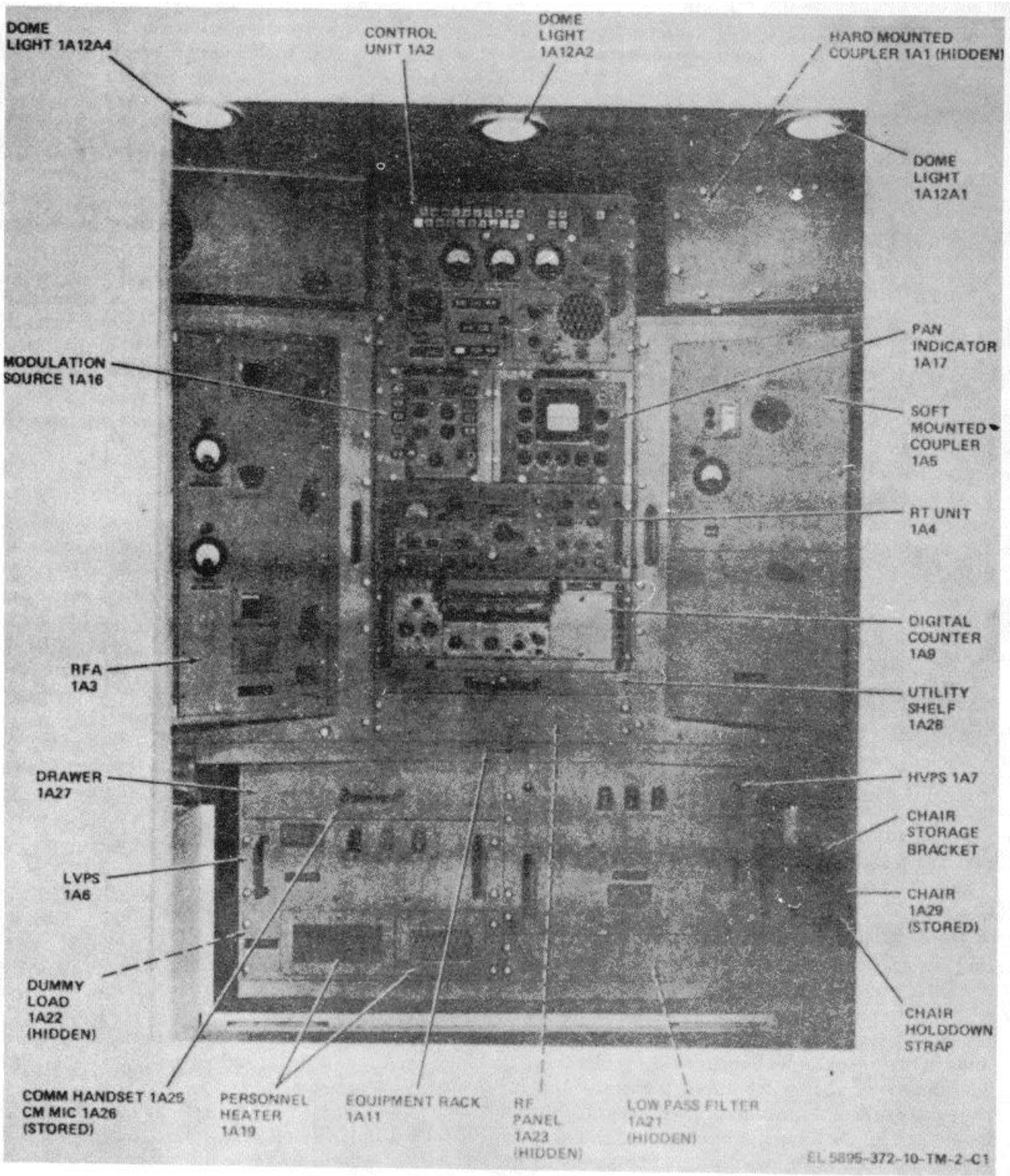


Figure 1-2. Operator's Compartment, forward view.

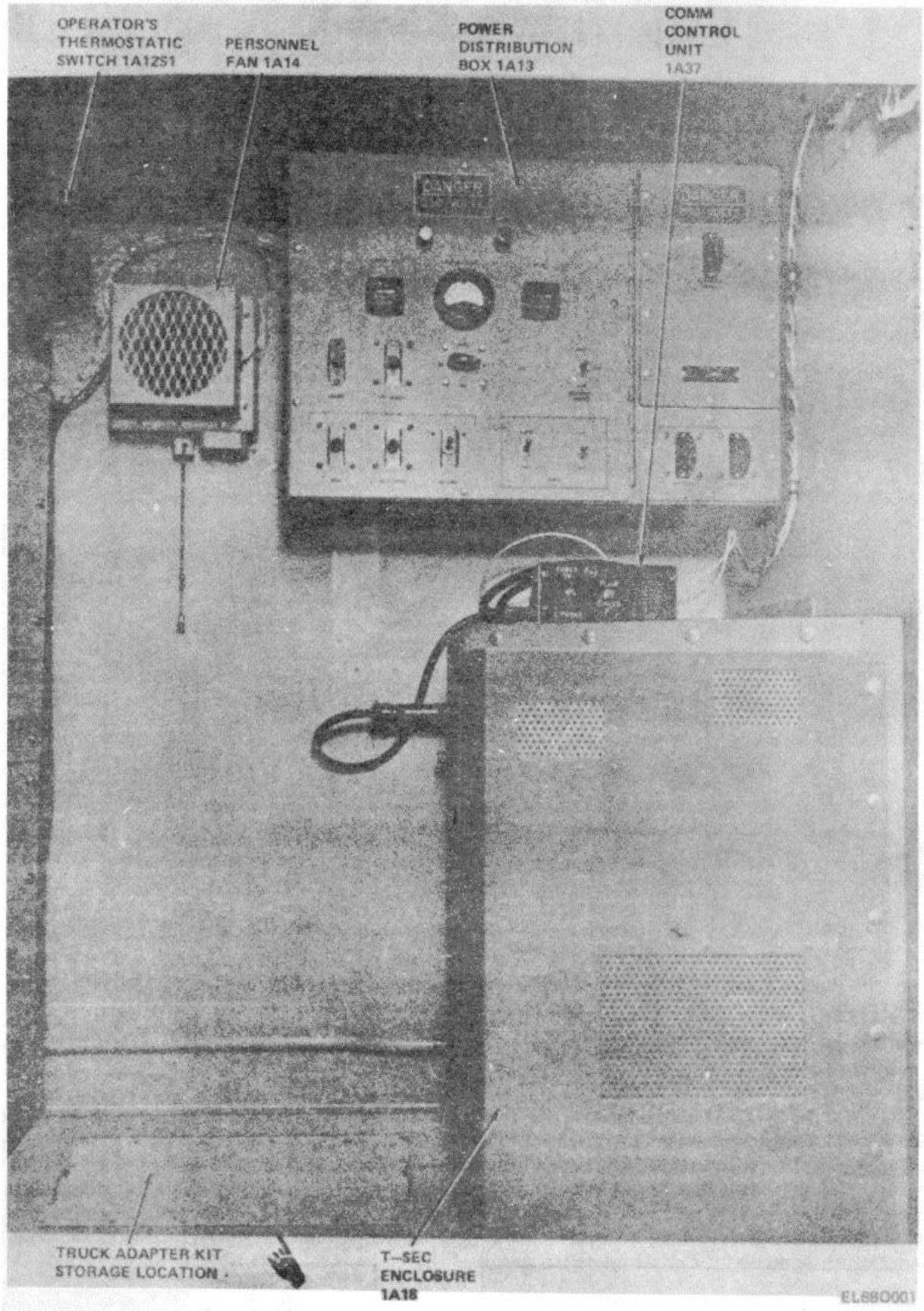


Figure 1-3. Operator's compartment, curbside view.

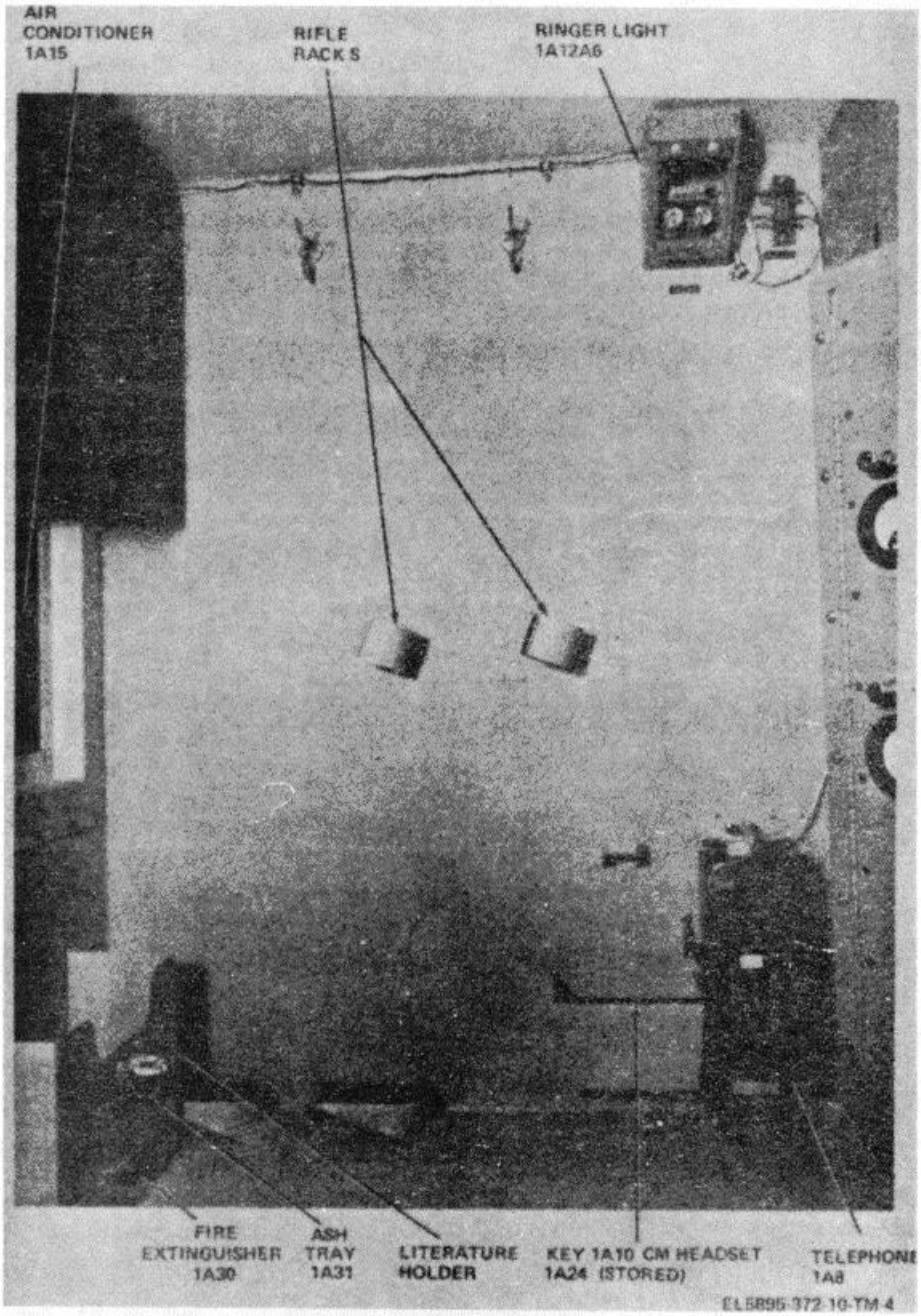


Figure 1-4. Operator's compartment, roadside view

input. Connectors on the rear panel mate with corresponding connectors on the shelter wiring harness.

(4) *Rfa (fig. 1-2).* The rfa is a modular, removable, slide-track mounted unit held in the equipment rack by captive screws. Two bow handles are provided for with drawing the unit for maintenance. A self-contained blower provides forced airflow through the unit. All controls and indicators appear on the front panel and are illuminated where necessary. Connectors on the rear panel mate with corresponding connectors on the shelter wiring harness.

(5) Rt unit (fig. 1-2). The rt unit is a modular, removable, slide-track mounted unit which is held in the equipment rack by captive screws Two bow handles are provided for withdrawing the unit which can be tilted on the slide tracks for ease of maintenance. All controls and indicators appear on the front panel and are illuminated where necessary; the front panel also contains two telephone jacks. Connectors

on the rear panel mate with corresponding connectors on the shelter wiring harness.

(6) Lvps (fig. 1-2). The lvps is a modular, re movable, slide-track mounted unit which is held in the equipment rack by captive screws. Two bow handles are provided for withdrawing the unit for maintenance. Three circuit breakers are located on the front panel. Connectors or the rear panel mate with corresponding connectors on the shelter wiring harness.

(7) Hvps (fig. 1-2). The hvps is a modular removable, slide-track mounted unit which is held in the equipment rack by captive screws Two bow handles are provided for withdrawing the unit for maintenance. Three circuit breakers, located on the front panel, are the complete controls. Connectors on the rear panel mate with corresponding connectors on the shelter wiring harness.

(8) Telephone (fig. 1-4). The telephone is located on the roadside wall of the shelter and is fully described in TM 11-5805-201-12.

(9) Digital counter (fig. 1-2). The digital counter is adapted for slide-track mounting and held in place by captive screws. The front pane is equipped with two bow handles for withdrawing the unit for maintenance. Connectors on the rear panel mate with corresponding connector on the shelter wiring harness. The digits counter is further described in TM 11-6625 700-10.

(10) Key (fig. 1-4). The key is located in the rack on the curbside of the shelter and is use for keying the modulation source when in cw operation.

(11) Power distribution box: (fig. 1-3). The power distribution box is a hard-mounted unit on the curbside wall of the shelter. Part of its structure extends through the rear of the operator's compartment. The extended portion of the unit provides external connectors for ground, main power, and telephone cable connections.

(12) Personnel fan (fig. 1-3). The personnel fan is located on the curbside wall of the shelter and provides ventilation for the operator's compartment.

(13) Air conditioner (fig. 1-4). The air conditioner is mounted through the rear wall of the operator's compartment. The air conditioner provides cool, dehumidified air for operating personnel. The air conditioner may also be uses to heat or ventilate the operator's compartment

(14) Modulation source (fig. 1-2). The modulation source is a modular, removable, slide track mounted unit which is mounted in the equipment rack by captive screws. The modulation source shares a 19-inch width rack and is adjacent to the pan indicator. The modulation source is further described in TM 11-5895-502 15.

(15) Pan indicator (fig. 1-2). The pan indicator is a modular, removable, slide-track mounted unit which is mounted in the equipment rack by captive screws. The pan indicator shares a 19-inch width rack and is adjacent to the modulation source. The pan indicator is further described in TM 11-5895-503-15.

(16) T-sec enclosure (fig. 1-3 and 1-5). The t-sec enclosure is an electrically shielded equipment cabinet enclosing encoder/decoder, a speaker, a secure comm mic amplifier, and the secure comm speaker amplifier. The t-sec enclosure and its contents provide secure-radio communications for the AN/TLQ-15. Part of its structure extends through the rear of the operator's compartment. The extended portion provides an external interconnection between the comm radio equipment in the shelter and the trailer.

(17) Personnel heater (fig. 1-2). The personnel heater is mounted at floor level and is held in place with captive screws. The unit contains electric heating elements, a blower, and an airflow-operated switch.

(18) Exhaust assembly. The exhaust assembly consists of two blowers, an actuator, airflow switches, and temperature sensors. All subassemblies of the exhaust assembly are located behind the equipment rack and not accessible to the operator. The exhaust assembly is used to ventilate and circulate air thru the shelter equipment compartment.

(19) Low pass filter (fig. 1-2). The low pass filter is rack-mounted at floor level and contains harmonic suppression filters. A 19-inch wide removable blank panel covers the filter.

(20) Dummy load (fig. 1-2). The dummy load is rack-mounted and located behind the personnel heater. The dummy load is a modular unit with two handles, an RF connector, and a thermal protection switch located on the exterior.

(21) Rf panel (fig. 1-2). The rf panel is rackmounted and contains rf components such as coaxial connectors, cables, detectors, and rf switching relays. Access to the components is obtained by removing the blank front panel.

(22) Cm headset (fig. 1-4). The cm headset is stored in a rack on the roadside wall of the shelter. The cm headset can be used to monitor AN/TLQ-15 reception at the control unit or rt. unit.

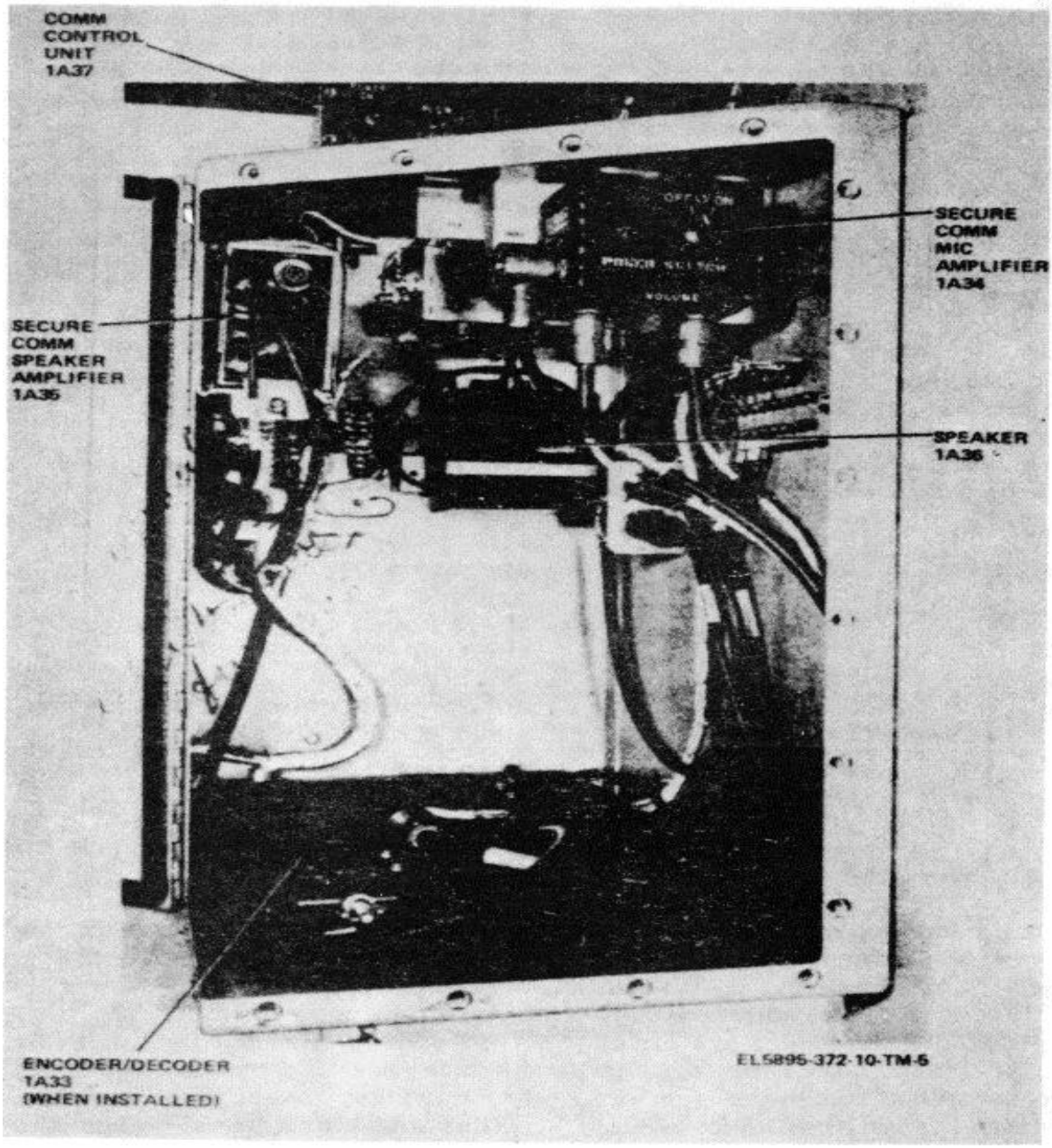


Figure 1-5. T-sec enclosure, interior view.

(23) Comm handset (fig. 1-2). The comm handset is used for two-way radio communications via the comm radio set. When not in use, the comm handset is stored in the equipment rack drawer.

(24) Cm mic (fig. 1-2). The cm mic is used for voice modulation source. When not in use, the mic is stored in the equipment rack drawer.

(25) Secure comm handset/headset. The secure comm handset/headset is used with the t-sec enclosure equipment and comm radio set to provide secure two-way communications. When not in use, the secure handset/headset is stored in the trailer spare parts case.

(26) Comm control unit (fig. 1-3). The comm control unit controls the encoder/decoder in the t-sec enclosure for secure or unsecure communications.

(27) Truck adapter kit(fig. 1-8). The truck adapter kit consists of a special bracket with provision for mounting the comm control unit and secure comm speaker amplifier. Included with the bracket is a grounding cable and circuit breaker protected battery connection to comm equipment in the vhf mobile communication mode. The truck

adapter kit is stored in the operator's compartment on the curbside (fig. 1-3).

b. Trailer. (fig. 1-6, 1-7). The trailer consists of the following major assemblies: trailer, generator, and comm radio set. The AN/VRC-47 enclosure is comprised of a comm rcvr, comm rt unit, comm rcv antenna, and other ancillary equipment. These

equipment. These assemblies are described in (1) through (12) below.

(1) *Trailer* (fig. 1-1). The M101A1 trailer transports and stores components of the AN/TLQ-15. Figure 2-23 identifies and locates these components in their stored or operating positions. The trailer is described in TM 9-2330-202-14P.

(2) *Generator* (fig. 1-6). The generator, located in the center of the trailer, is the main source of power for the AN/TLQ-15. The VOLT ADJ knob on the generator has been modified to a push-to-turn type for AN/TLQ-15 application. The generator is further described in TM 5-6115-450-15.

(3) *AN/VRC-47 enclosure* (fig. 1-7). The enclosure is comprised of comm rcvr, comm rt unit, comm rcv antenna, a fixed filter, a tunable bandpass filter, plus a power supply. The comm rt unit and the comm rcvr is further described in TM 11-5820-401-12.

(4) *Whip antenna* (fig. 1-1). The whip antenna is a telescopic type which, when fully erected, is approximately 35 feet high. The whip antenna is part of the cm antenna and is stored in the trailer when not in use (fig. 1-6).

(5) *Insulator* (fig. 1-6). The insulator serves the dual purpose of insulating the whip antenna from the shelter while also providing the antenna supporting socket and latching device. The insulator has captive thumbscrews which secure it to the shelter roof or its storage base in the trailer.

(6) *Shelter opening cover*. The shelter opening cover is installed in place of the insulator when the insulator is stored in the trailer. The cover is secured to the shelter roof with captive thumbscrews. When the insulator is in use, the cover is secured to the insulator storage base in the trailer.

(7) *Counterpoise* (fig. 1-6). The counterpoise consists of four assemblies, each assembly having six crank operated take-up reels with metal cables. When not in use, the counterpoise is stored in special racks in the trailer.

(8) *Comm cable* (fig. 1-7). The comm cable consists of a crank operated, rachet-controlled, takeup reel which stores and dispenses the comm cable from the trailer to the power distribution box on the shelter.

(9) *Main power cable assembly* (fig. 1-7). The main power cable assembly consists of a springloaded, rachet-controlled, take-up reel which stores and dispenses the main power cable from the trailer to the power distribution box on the shelter.

(10) *Auxiliary power cable* (fig. 2-23). This cable is stored coiled on the floor of the trailer with its associated surge protector and is used for connecting to a power source other than the generator on the trailer.

(11) *Ground stakes* (fig. 1-7). The ground stakes are located on the front inboard and outboard sides of the power unit trailer. The ground stakes disassemble into separate parts and are used to establish ground connection for the trailer and the shelter.

(12) *Remote telephone junction box*. The remote telephone junction box is a triangular shaped box equipped with a toggle switch and binding posts for attaching to a telephone line; the remote telephone junction box is stored in the spare parts case (fig. 1-6) in the trailer.

1-10. Tabulated Data

The technical characteristics for the AN/TLQ-15 are listed in table 1-2. Weights and dimensions of equipment components are listed in table 1-3.

Table 1-2. Technical Characteristics of AN/TLQ-15 Countermeasures

Receive.	
Frequency coverage	1.5 to 20 MHz
Frequency control	Phase locked loop synthesizer Continuous turning in 10 Hz increments Receiver and transmitter tuned simultaneously
Accuracy	± 100 Hz
Frequency track	AFC or manual
Output	Speaker, headset, handset, pan display, S-meter, audio meter, and digital frequency meter
Modes of operation	CW, usbsc, Isbsc, am.
Transmit	
Frequency coverage	1 5 to 20 MHz
Frequency control	Phase locked loop synthesizer same as used by the receiver
Frequency track	AFC by victim signal Lock-m range ± 500 Hz or ± 3.5 kHz of receiver frequency
Output	750 watts or 2000 watts RF carrier
Modulation modes	From built-in modulation source: am, fm, fm/chirp, tfk, dsabsc, dsbsc/fm Voice from microphone CW by manual key
Operating modes	Sij -signal initiated transmit Cont-continuous transmit Lock-thru-alternating receive and transmit cycle Voice rt-for normal voice com-munication
Monitoring	Indicator lights, meters, pan display, digital frequency meter, and overload protective circuitry
Type of operation	Fixed station with limited remote (high voltage on/off only)
Primary power	
Voltage	208 vac
Phase	3
Frequency	400 Hz ± 25 Hz
Power	10 kw
Antenna system	Vertical, self-supporting with counterpoise system

Table 1-2. Technical Characteristics of AN/TLQ-15-Continued

Communication	
Comm recr:	
Frequency coverage	Band A:30 to 52.95 MHz Band B:53 to 75.95 MHz
Number of channels	920
Modulation	FM voice
Antenna	Three section whip
Primary power	25.5 vdc at 3 amperes
Comm rt unit:	
Frequency coverage	Band A:30 to 52.95 MHz Band B:53 to 75.95 MHz
Number of channels	920
Modulation	FM voice
Transmitter power	Low: 1 to 3 watts High 35 watts (min)
Antenna	Center-fed whip
Primary power	Low power: 25.5 vdc at 3 amperes High power: 25.5 vdc at 10 amperes
Telephone	
Wire	Two conductors
Primary power	Two BA-30 batteries or any 3 vdc source

Type of operation	**Fixed or mobile**
Secure communication	
Encoder/decoder and associated equipment	
Interlock circuitry between AN/TLQ-15 and communication systems to maintain secure communication.	
Primary power source	
Gasoline engine-driven generator mounted on trailer:	
Voltage	208 vac
Phase	3
Frequency	400 Hz ± 25 Hz
Power	10 kw
Shelter weight and dimensions	
Weight	2,202 lb.
Height	72.5 in.
Length	102.5 in.
Width	79.5 in.
Trailer weight and dimensions	
Weight	2,672 lb.
Height	83 in
Length	147 in.
Width	73.5 in.

Table 1-3. Equipment Weight and Dimensions

Item	Quantity	Dimension (in.)			Weight
		Height	Depth	Width	(lb)
Shelter (complete)	1	71.5	101.0	80.5	1790.0
Equipment rack (includes wiring)	1	61.5	32.0	71.5	192.0
Power distribution box	1	8.0	27.0	16.0	49.0
Dummy load	1	8.62	24.31	10.62	18.0
Low pass filter	1	4.5	16.0	12.5	35.0
Control unit	1	1.25	18.0	19.0	75.0
RFA	1	31.5	23.0	19.0	55.0
Rt unit	1	7.125	24.75	19 0	75.0
Soft mounted coupler	1	31.25	24.5	19.0	84 0
Digital Counter	1	6.4	21.5	18.86	43.0
LVPS	1	7.0	19.0	13.0	15.0
HVPS	1	12.5	19.0	21.0	105.0
Personnel heater	1	5.3	18.62	19.0	13.0
Modulation	1	8.5	13.25	7.13	19.0
Whip antenna	1	420.0	-		53.0
Comm rt unit	1	9.0	12.0	15.5	52.0
Comm rcvr	1	9.0	12.0	5.25	18.5
RF panel	1	2.0	21.0	19.25	11.5
Air conditioner	1	28.5	17.0	17.0	137
Remote telephone junction box	1	4.0	2.75	2.75	0.5
Pan indicator	1	8.5	17.25	10.38	13.5
Trailer	1	83.0	147.0	73.5	1340
Insulator	1	17.0	--	13.5 dia	39
Main power cable assembly	1	18.0	16.5	14.0	35.0
Comm cable	1	23.0	22.0	18.0	139.0
Counterpoise	4	10.0	10.0	10.0	60.0
Extender cables	1	10.0	33.0	12.0	85.0
Auxiliary power cable	1	10.5 long	-	-	5.0
AN/VRC-47 enclosure	1	20.0	20.5	38.0	81.0

Table 1-3. Equipment Weights and Dimension-Continued

Item	Quantity	Dimension (in.)			Weight (lb)
		Height	Depth	Width	
comm rcv antenna	1	11.25	-	-	1.0
Spare parts case	1	12.0	12.0	24.0	10.0
T-sec enclosure	1	25.0	19.0	15.0	25.5
Secure com peter amplifier	1	5	3.0	5.0	4.5
Secure corm mic amplifier	1	5	6.0	3.0	2.5
Comm control unit	1	2.75	5.0	5.75	1.25
Secure comm handset/headset	1	8.0	3.0	2.0	0.5
Truck adapter it	1	11.0	7.88	13.75	4.0

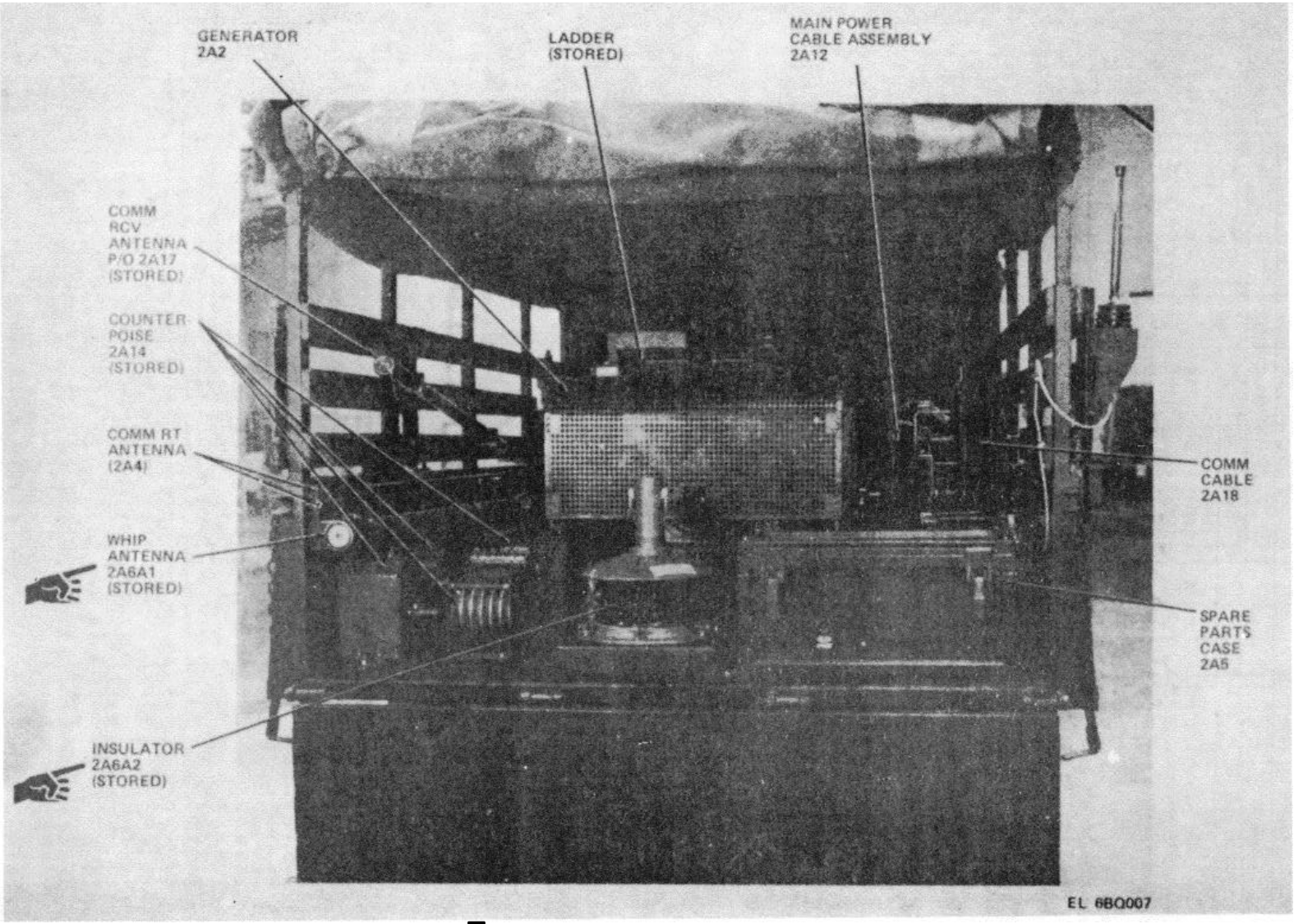


Figure 1-6. Trailer, rear view

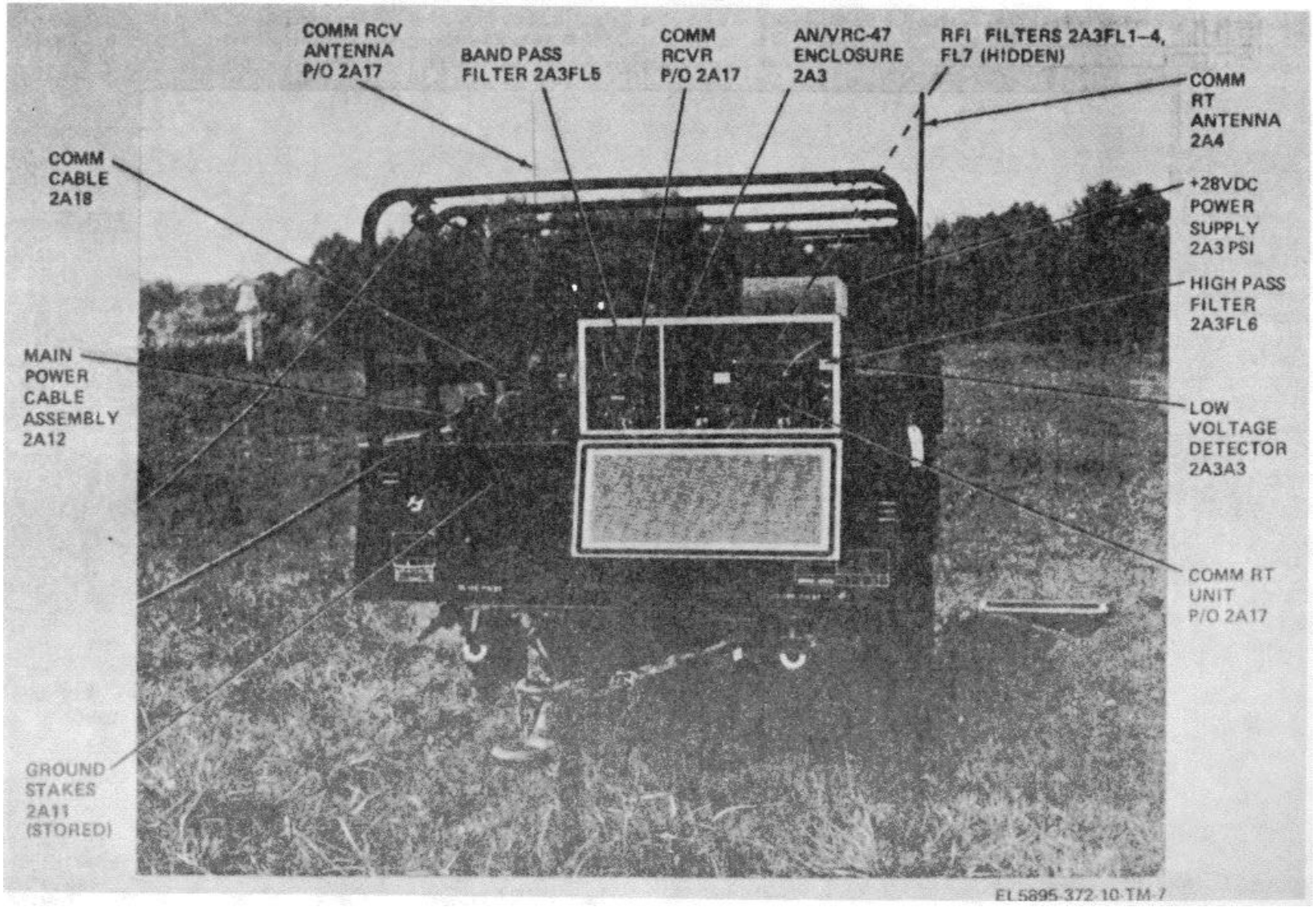


Figure 1-7. Trailer, front view

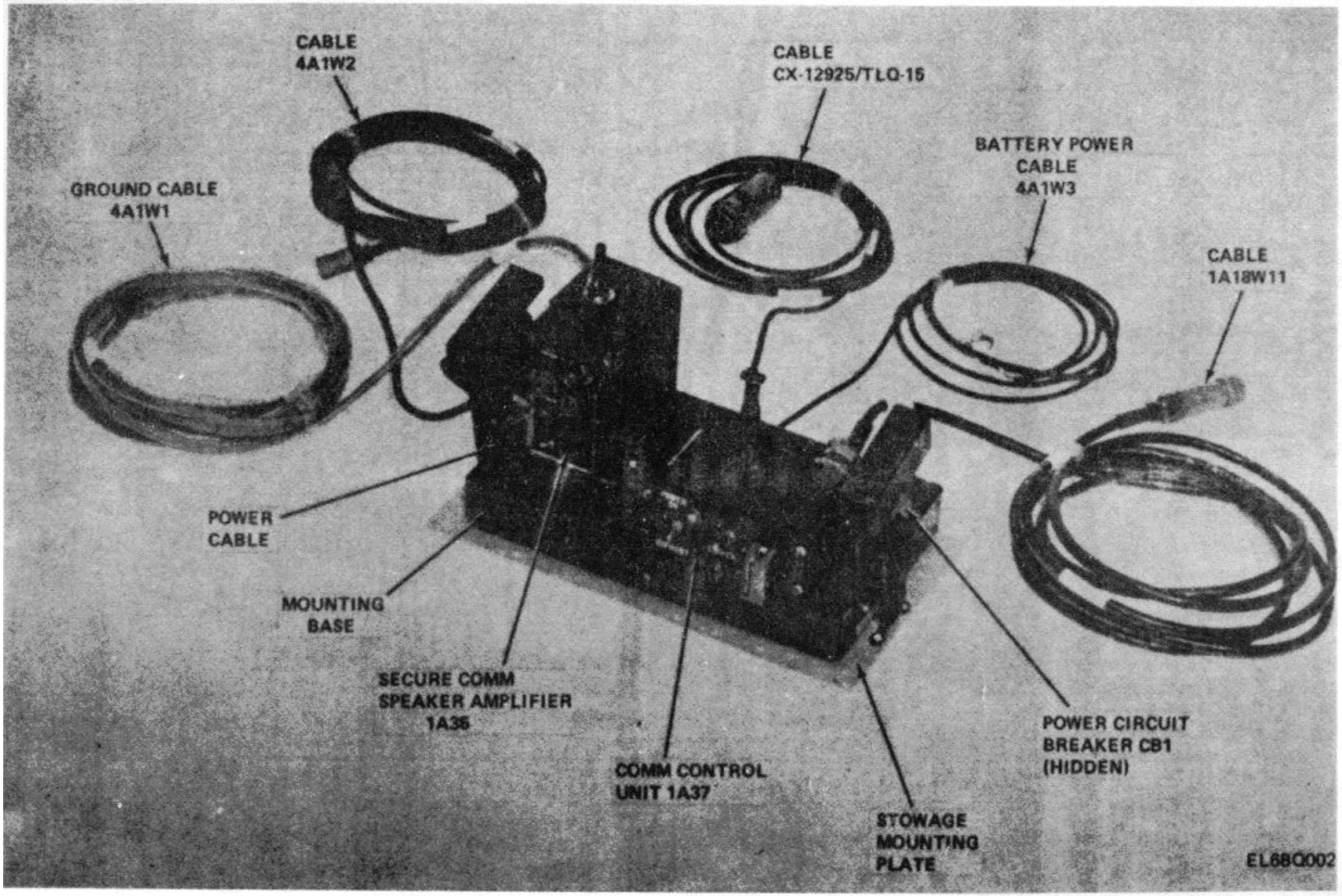


Figure 1-8. Truck adapter kit

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

WARNING

Before operating the AN/TLQ-15, be sure all requirements of TB SIG 291 are met. Injury or DEATH could result from improper or careless operation.

2-1. General

This chapter describes the functions of the controls, indicators, and connectors of the AN/TLQ-15 and provides procedures for operating the equipment under both usual and unusual conditions.

2-2. Damage from Improper Settings

Improper setting of the switching sequence or unrealistic control settings can generate an alarm indicator and cause possible damage to the equipment.

WARNING

Dangerous RF power exists in and

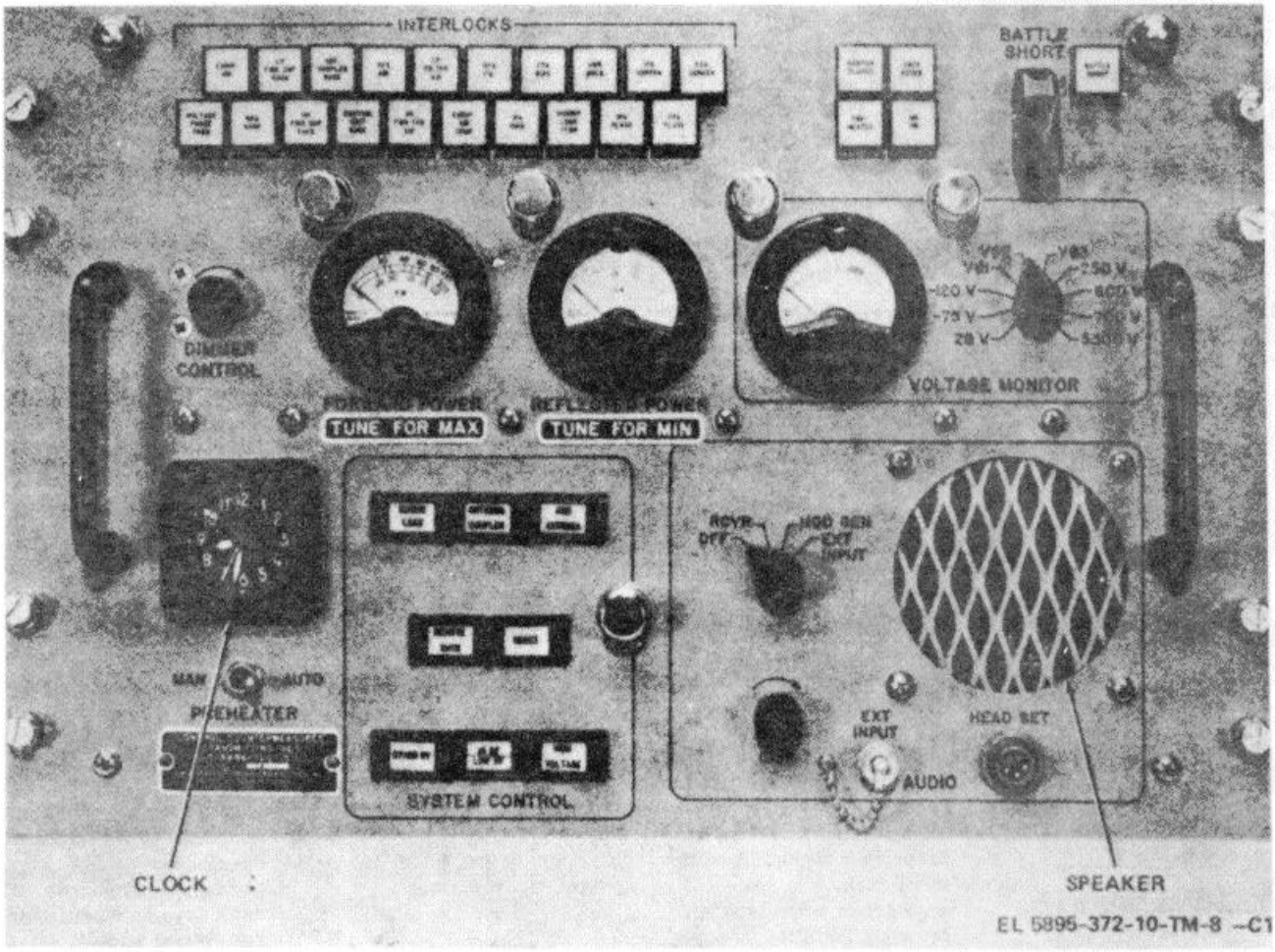


Figure 2-1. Control unit, controls, indicators and connectors

around the cm antenna and counterpoise during operation. Do not operate the AN/TLQ-15 with personnel in contact with or in close proximity to these components. Before attempting any adjustment or disassembly of the cm antenna or counterpoise, power should be removed from the equipment.

CAUTION

Do not operate the AN/TLQ-15 with the control unit BATTLE SHORT switch on except in case of extreme emergencies. The battle short circuit bypasses all the overload protection circuits of the AN/TLQ-15. It is intended for use only in tactical situations where the equipment must be kept operational. Continued use of the battle short in the presence of an overload condition may result in damage to the equipment.

2-3 Operator/Crew Controls

Tables 2-1 through 2-20 list operator's controls, indicators and connectors for the units of the AN/TLQ-15. The function of each item listed is described.

Table 2 -1. Control Unit, Controls, Indicators and Connectors (fig. 2-1)

Control, indicator or connector	*Function*
INTERLOCKS group	Monitors critical interlock circuits of the AN/TLQ-15. Lights green when all monitored circuits are operating correctly. When a malfunction occurs, associated indicators, and all indicators to the right of that indicator, will go out to indicate the source of trouble.
VOLTAGE PHASE FREQ indicator	Lights green when voltage, phase and frequency of generator primary power are correct.
EQUIP. AIR indicator	Lights green when exhaust assembly fans are operating.
RFA RACK indicator	Lights green when rfa properly installed in equipment rack.
HV PWR SUP RACK indicator	Lights green when hvps is properly installed in equipment rack
LV PWR SUP RACK indicator	Lights green when lvps is properly installed in equipment rack.
ANT. COUPLER RACK indicator	Lights green when soft-mounted coupler is properly installed in equipment rack
CONTROL UNIT RACK indicator	Lights green when control unit is properly installed in equipment rack.
RFA AIR indicator	Lights green when rfa fan is operating.
HV PWR SUP AIR indicator	Lights green when hvps an is operating.
I.P FILTER AIR indicator	Lights green when low pass filter fan is operating.
EQUIP. AIR TEMP indicator	Lights green when temperature in equipment compartment is within safe operating limits (below 150°F).
RFA FIL indicator	Lights green after power has been applied to fpa filament for approximately 3 minutes
IPA BIAS indicator	Lights green when bias voltage is applied to ipa tube in rfa.
FPA BIAS indicator	Lights green when plate voltage is applied to fps tube in rfa.
DUMMY LOAD TEMP indicator	Lights green when dummy load is not overheated.
SWR OVLD indicator	Lights green when vswr between rfa output and cm antenna is within accept able limit
IPA PLATE indicator	Lights green when plate voltage is applied to pa tube in the rfa.
IPA SCREEN indicator	Lights green when screen voltage is applied to IPA tube in rfa.
FPA PLATE indicator	Light green when plate voltage is applied to fpa tube in rfa.
FPA SCREEN indicator	Lights green when seen voltage is applied to fpa tube in rfa.
DAMPER CLOSED indicator	Lights white when equipment compartment temperature is less than 120°F and exhaust assembly damper door is closed.
XMTR KEYED indicator	Lights white when keying signal is applied to rt unit. (The indicator will go out at a rate determined by keying patterns.. Keying of rt unit places RF carrier on the air.)
PREHEATER indicator	Lights white when heating elements of preheater are energized.
AM ON indicator	Light green when internal or external am. modulation is selected at rt unit.
BATTLE SHORT switch with hood	Electrically bypasses all equipment interlocks and overload circuits when set

Table 2-1. Control Unit, Controls, Indicators and Connectors (fig. 2-1) - Continued

Control, indicator or connector	*Function*
	to on (up) position. Used only during emergency op-rating conditions.
BATTLE SHORT indicator	Lights red when BATTLE SHORT switch has been actuated.
DIMMER CONTROL	Permits intensity adjustment of all front panel lights and indicators on control unit, modulation source, and pan indicator.
FORWARD POWER meter	Indicates RF forward power.
REFLECTED POWER meter	Indicates RF reflected power.
VOLTAGE MONITOR group meter	Permits measurement of key ac and dc supply voltages (except for +24 vdc) when used in conjunction with VOLTAGE MONITOR switch. Meter circuit converts all monitored inputs to go-no-go type readings. Readings within acceptable limits are displayed within green area on VOLTAGE MONITOR meter scale.
Switch	Selects one of 10 inputs for display on VOLTAGE MONITOR meter as follows:
Switch Position	*Measurement*
28 V	+28 vdc converter output.
-75 V	Lvps -75 vdc ipa bias output.
-120 V	Lvps - 120 vdc fpa bias output.
Vϕl	Phase 1 voltage from generator.
Vϕ2	Phase 2 voltage from generator.
Vϕ3	Phase 3 voltage from generator.
250 V	Lvps +250 vdc ipa screen voltage output.
600 V	Lvps +600 vdc ipa plate voltage output.
700V	Hvps +700 vdc fpa screen voltage output.
3500 V	Hvps + 3500 vdc. fpa plate voltage output.
Clock	Standard wind-up timepiece with sweep second hand. A control is provided for starting, stopping and resetting sweep second hand.
PREHEATER switch	Selects one of two modes of operation for preheater as follows:
Switch Position	*Function*
MAN	*Bypasses thermostat and applies power directly to preheater.*
AUTO	*Thermostatically controls operation of preheater.*
SYSTEM CONTROL group	
DUMMY LOAD switch	a. Switch. When set to on position, connects dummy load to rfa output. b. Indicator (white). Indicates DUMMY LOAD switch is set to off position. c. Indicator(green). Indicates DUMMY LOAD switch is set to on position.
ANTENNA COUPLER switch	a. Switch. When set to on position, connects rfa to soft-mounted and hard-mounted couplers. b. Indicator (white.) Indicates ANTENNA COUPLER switch is set to off position. c. Indicator(green). Indicates ANTENNA COUPLER switch is set to on position.
AUX ANTENNA switch	a. Switch. When set to on position, connects RE' output of rfa to auxiliary antenna connector on remote junction box. b. Indicator (white). Indicates AUX ANTENNA switch is set to off position. c. Indicator (green). Indicates AUX switch is set to on position.
REMOTE XMTR switch	a. Switch. When set to off position, permits local keying of transmitter carrier. When set to on position, permits keying of transmitter carrier from a remote location by way of a telephone line. b. Indicator (white). Indicates REMOTE XMTR switch is set to off position. c. Indicator (green). Indicates that REMOTE XMTR switch is set to on position.
RESET switch	a. Switch. When depressed, generates reset pulse to reset overload relays in controy unit, lvps and hvps following correction of an overload condition.

Table 2-1. Control Unit, Controls, Indicators and Connectors (fig. 2-1)-Continued

Control, indicator or connector	*Function*
	b. Indicator (red). Indicates vswr or high voltage overload condition requiring overload relays to be reset after condition is corrected.
STANDBY switch	a. Switch. When set to on position (plus 3 minutes), applies filament and bias voltages to rfa.
	b. Indicator (white). Indicates STANDBY switch is set to off position.
	c. Indicator (green). Indicates STANDBY switch is set to on position.
HI RF-LOW RF switch	a. Switch. Selects either high or low RF power output mode for transmitter.
	b. Indicators (green). When LOW RF indicator is lit, switching is set for low RF power output mode. When HI RF indicator is lit switching is set for high RF power output mode.
HIGH VOLTAGE switch	a. Switch. When set to on, applies high voltage to rfa.
	b. Indicator(white.) Indicates HIGH VOLTAGE switch is set to off position.
	c. Indicator (yellow). Indicates HIGH VOLTAGE switch is set to on position.
AUDIO group	
Switch (four-position)	Selects one of four modes of operation for control unit audio circuits as follows:

Switch Position	*Function*
OFF	Disables control unit speaker.
RCVR	Permits audio output of rt unit to be monitored on speaker.
MOD GEN	Permits output of modulation source to be monitored
EXT INPUT	Permits an external audio input to be monitored on control unit speaker.

GAIN control	Adjusts gain of control unit audio amplifier.
EXT INPUT connector	Permits connection of external audio signal to input of control unit audio amplifier circuit when AUDIO switch is set to EXT INPUT.
HEAD SET connector	Permits connection of a headset to control unit audio amplifier circuit.
Speaker	Makes received signal audible.

Table 2-2. Rfa, Controls, Indicators and Connectors (fig. 2-2)

Control, indicator, or connector	*Function*
PA LOAD TUNE dial indicator	Indicates band and frequency to which fpa load circuit is tuned.
Fpa load tune control	Tunes fpa load circuit to desired frequency.
PL PLATE TUNE dial indicator	Indicates band and frequency to which plate circuit is tuned.
Fpa plate tune control	Tunes fpa plate circuit to desired frequency.
PA TUNE meter	Indicates fpa dc current for tuning.
IPA TUNING dial indicator	Indicates band and frequency to which ipa load circuit is tuned.
Ipa tuning control	Tunes ipa load circuit to desired frequency.
IPA TUNE meter	Indicates ipa RF power level for tuning.
BAND SELECT switch (five-position)	Selects desired frequency band for rfa as follows:

Switch Position	*Frequency Band (MHZ)*
1	1.5 to 2.5
2	2.5 to 4.2
3	4.2 to 7.1
4	7.1 to 12.0
5	12.0 to 20.0

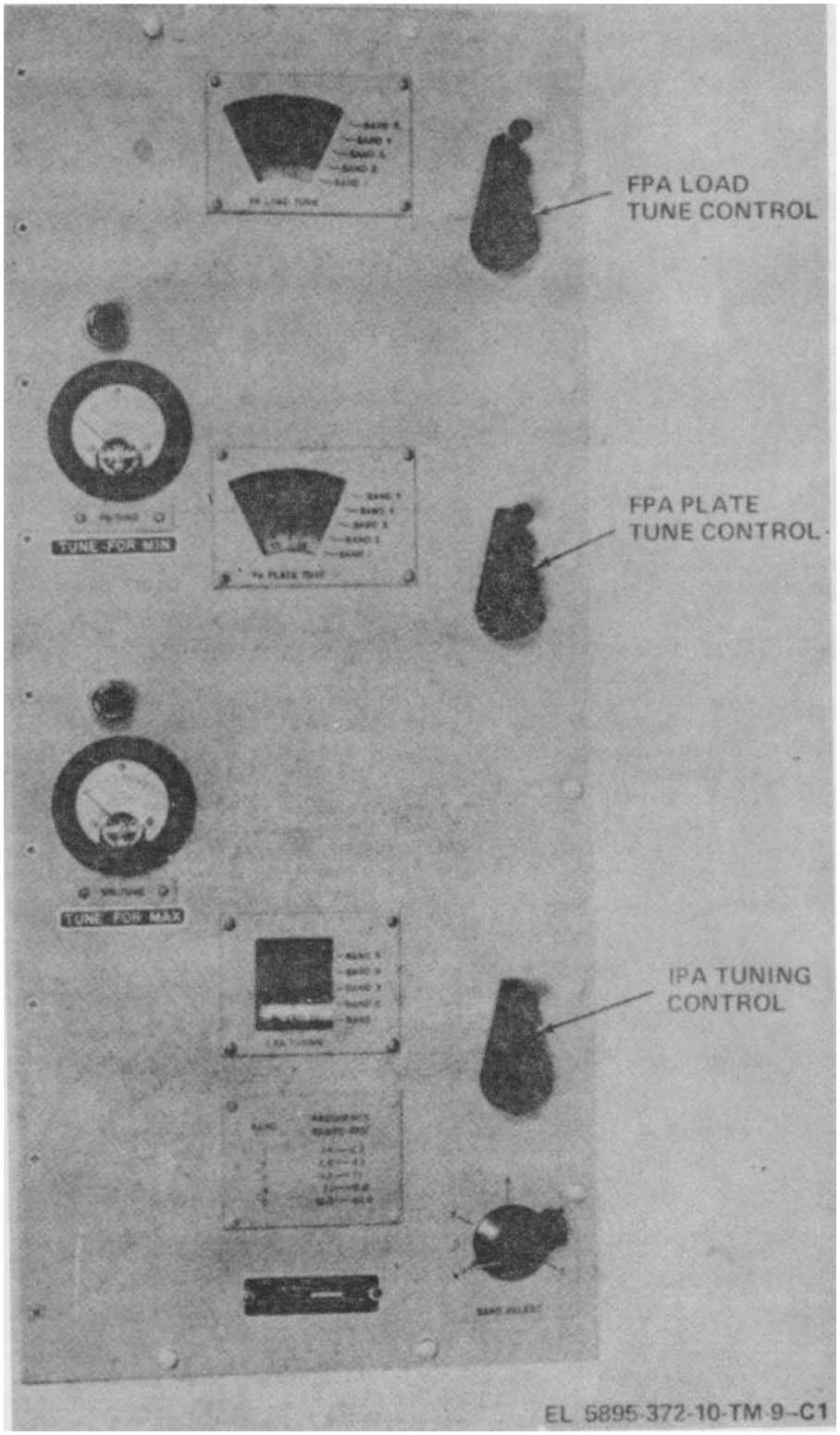


Figure 2-2. Rfa, controls, indicators and connectors.

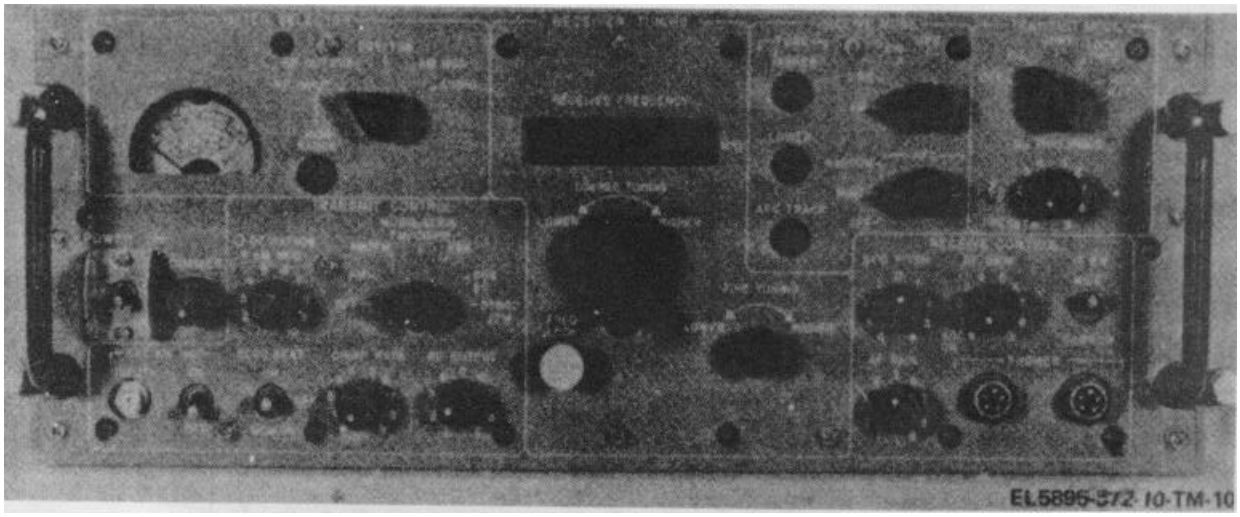


Figure 2-3. Rt unit, controls, indicators and connectors.

Table 2-3. Rt Unit, Controls, Indicators and Connectors (fig. 2-3)

Control, indicator or connector	Function
POWER ON circuit breaker	When set to POWER ON, applies primary ac power to unit and provides overload protection.
DIMMER control	Adjusts intensity of front panel lights.
METER SELECTOR group switch (five-position) meter as follows:	Selects one of five inputs for monitoring on associated meter.
Switch Position	*Measurement*
RF INPUT	*Rms level (in microvolts) of received input signal.*
RF OUTPUT	*Peak level of transmitted* RF output.
DEV/FSK	Frequency deviation in kHz for fm and fsk modulated output signals.
AM MOD	Am. in percentage.
AUDIO	Audio output level in db.
Meter	Provides meter indications on six scales. A high and a low scale is provided for the RF input function. The remaining four functions are provided one scale each.
HIGH RANGE indicator	When lighted, indicates high RF input, power scale of meter should be read.

Table 2-3. Rt Unit, Controls, Indicators and Connectors (fig. 2-3)-Continued

Control, indicator or connector	Function
TRANSMIT CONTROL group	
DEVIATION control (concentric with AM MOD control)	Adjusts frequency deviation of transmitted output signal in fm mode.
AM MOD control (concentric with DEVIATION control)	Adjusts percentage of modulation of transmitted output signal in am. mode.
EXT AM MODE INPUT connector	Input connection for external am. source.
EXT AM MOD switch	
Switch Position	Function
ON	*Selects external am. modulation source input from EXT AM MOD INPUT connector.*
OFF	*Selects internal am. modulation source.*
MODULATION switch (seven-position)	Selects modulation for transmitter as follows:
Switch Function	*Modulation*
OFF	*None*
AM	*Amplitude modulation*
AM/FM	*Frequency modulation and/or amplitude modulation*
FM/CHIRP	*Provides frequency mod-*

Table 2-3 Rt Unit, Controls, Indicators and Connectors (fig. 2-3) - Continued

Control, Indicator or connector	*Function*
Switch Function	*Modulation*
	ulation and frequency modulated chirp (wobble) in conjunction with CHIRP RATE control
FSK	Frequency shift keying
DSB SC	Double sideband suppressed carrier
DSBSC/FM	Frequency modulated double sideband suppressed carrier.
ZERO BEAT switch (momentary/lock-type)	When set to ON or MOM ON position, provides an audible beat signal as an aid to tuning in victim signal.
CHIRP RATE control (with on-off switch)	Adjusts chirp (or wobble) rate of rf output signal when employing keyed cw transmission. Chirp is switched off in extreme counterclockwise position (OFF).
RF OUTPUT control	Adjusts RF output level of transmitted signal.
RECEIVER TUNING group	
RECEIVED FREQUENCY MHz indicator	Displays rt unit tuned frequency in megahertz.
COARSE TUNING control	Sets rt unit tuned frequency as displayed on RECEIVED FREQUENCY MHz indicator. Changes frequency in direction indicated by LOWER HIGH arrow.
FREQ LOCK control	Electronically locks COARSE and FINE TUNING controls when depressed and released. Lights yellow when frequency is locked.
FINE TUNING control	Makes fine adjustments to rt unit frequency in direction indicated by LOWER HIGHER arrow.
RECEIVE MODE group	
TUNE indicators:	
HIGHER	When lighted red, indicates mistuning of rt unit receiver circuit during afc tracking and that rt unit should be tuned to higher frequency.
LOWER	When lighted red, indicates mistuning of rt unit receiver circuit during afc tracking and rt unit should be tuned to lower frequency.
AFC TRACK	When lighted red, indicates afc tuning circuits are being driven.
Switch (four-position)	Selects mode of receiver operation as follows:
Switch Position	*Mode*
AM	Amplitude modulation
LSB	Lower sideband
CW	Continuous wave
USB	Upper sideband
AFC switch (three position)	Selects on of three modes of operation for afc circuit as follows:
Switch Position	*Function*
OFF	Disables afc circuits.
WIDE	Sets lock-in range of afc circuit to ±3.5 kHz o rt unit receiver setting. Afc circuit will automatically adjust rt unit transmitter output frequency to track victim signal within this range (for all settings of the TRANSMIT MODE switch except CONT).
NARROW	Sets lock-in range of afc circuit to ±500 Hz of rt unit receiver setting. Afc circuit will automatically adjust rt unit transmitter output frequency to track victim signal within

Table 2-4 Rt Unit, Controls, Indicators and Connectors (fig. 2-3-Continued

Table 2-3. Rt Unit, Controls, Indicators and Connectors (fig. 2-3) - Continued

Control, indicator or connector	*Function*
	Switch Position / *Function*
	this range (for al settings of the TRANSMIT MODE switch except CONT).
RECEIVE CONTROL group	
BFO PITCH control	Adjusts pitch of beat frequency when receiving cw signals and adjusts frequency of reinserted causes when in ssbsc.
AF GAIN control	Adjusts gain of audio amplifier.
RF GAIN control	Adjusts receiving RF gain when agc function is not used is set to agc on detent (fully counterclockwise), receiver gain of rt unit is controlled automatically by the agc circuits.
IF BW switch	When set to NARROW, receiver if unit is approximately 5.7 kHs bandwidth is approximately 12 kHz.
PHONES connectors (two)	Permits connection of up to two headsets to audio output circuits of rt unit.
TRANSMIT MODE switch	Selects mode of transmitter (five-position) lows:
	Switch Position / *Function*
	OFF / Disables transmitter section of rt unit.
	SIJ / Selects signal-initiated-transmitting mode of operation.
	CONT / Selects continuous mode of transmission.
	LOOK THRU / Selects alternating receive and transmit mode of operation.
	VOICE R/T / Allows rt unit to operate a communications re-

Table 2-3. Rt Unit, Controls, Indicators and Connectors (fig. 2-3) - Continued

Control, indicator or connector	*Function*
	Switch Position / *Function*
	ceiver-transmitter.
SIJ THRESHOLD control	Adjusts signal-initiated transmission threshold level. When control is set to PRESET, threshold is approximately 5 microvolts. Variable range of control adjusts threshold from less than 5 microvolts to approximately 1000 microvolts.

Table 2-4 Soft-Mounted Coupler, Controls, Indicators, and Connectors (fig. 2-4)

Control, indicator or connector	*Function*
BAND SELECT switch (14-position)	Selects desired frequency band between 1.50 MHz and When set to 20.0 MHz in 1.0 MHz incremental step positions.
FREQUENCY BAND MHz dial indicator	Indicates frequency to which soft mounted coupler is tuned.
RF power meter	Indicates rf reflected power.
PUSH TO TUNE switch	When depressed, removes bandwidth of from the rfa to permit soft mounted coupler When set to WIDE, to connected to rt unit rf output.
TUNE control	Tunes soft-mounted coupler to desired frequency within selected band.

Table 2-5. Lvps, Controls, Indicators, and Connectors (fig. 2-5)

operation for rt unit as follows:

Control, indicator or connector	*Function*
BIAS circuit breaker	When set to ON, applies primary ac power to -75 and -120 vdc bias power supply circuits and provides overload protection.
+250 circuit breaker	When set to ON, applies primary ac power to +250 vdc power supply circuits and provides overload protection.
+700 circuit breaker	When set to ON, applies primary ac power to +700 vdc power supply circuits and provides overload protection.

Tables 2-6. Hvps, Controls, Indicators, and Connectors (fig. 2-6)

Control, indicator or connector	*Function*
FILAMENT circuit breaker	When set to ON, applies primary ac power to rfa fila-

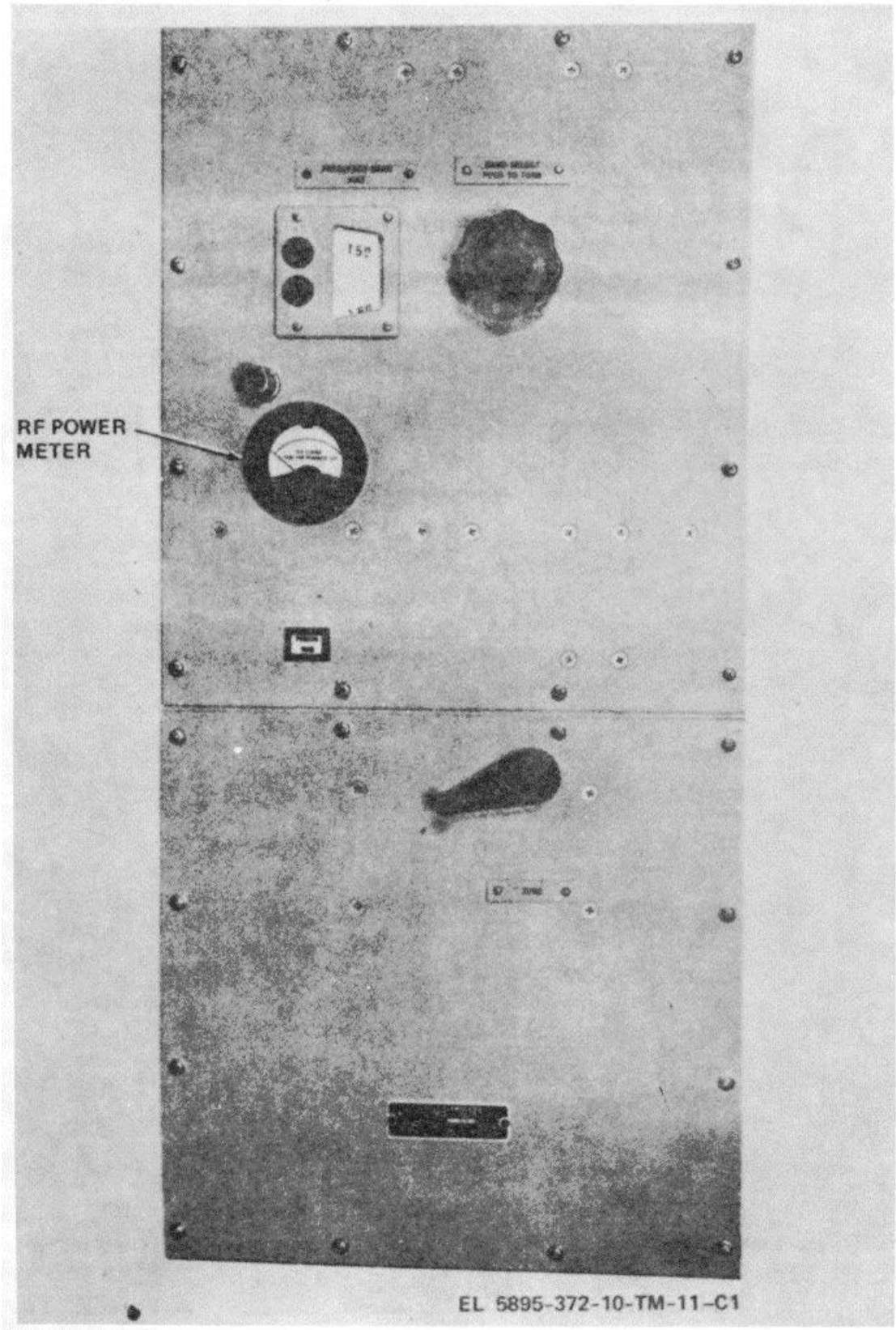


Figure 2-4. Soft-mounted coupler, controls, indicators and connectors.

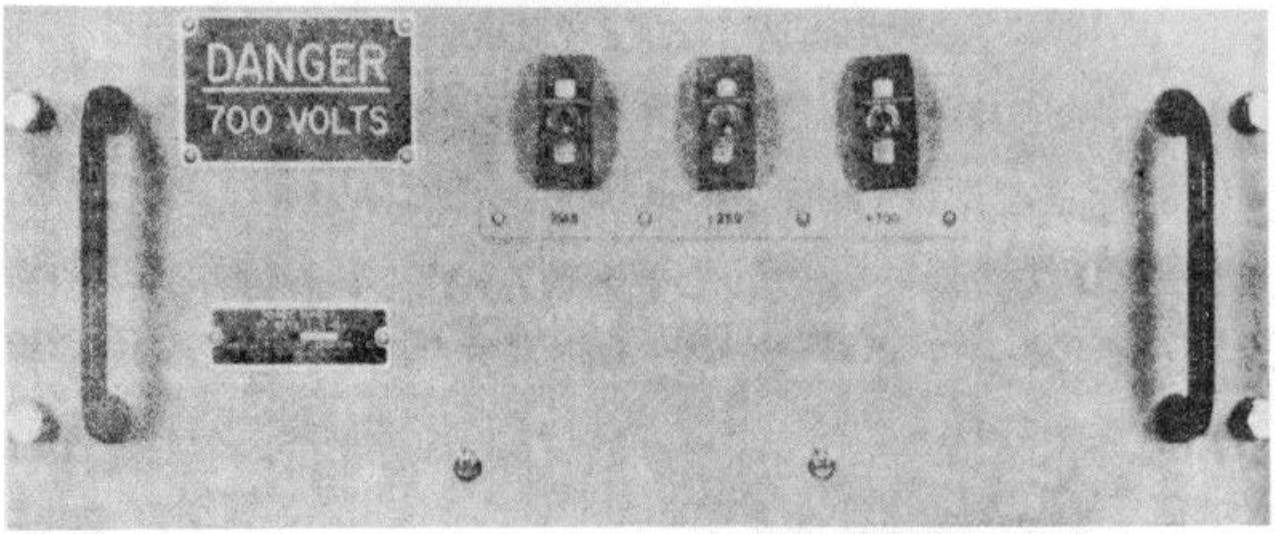


Figure 2-5. Lvps, controls, indicators and connectors.

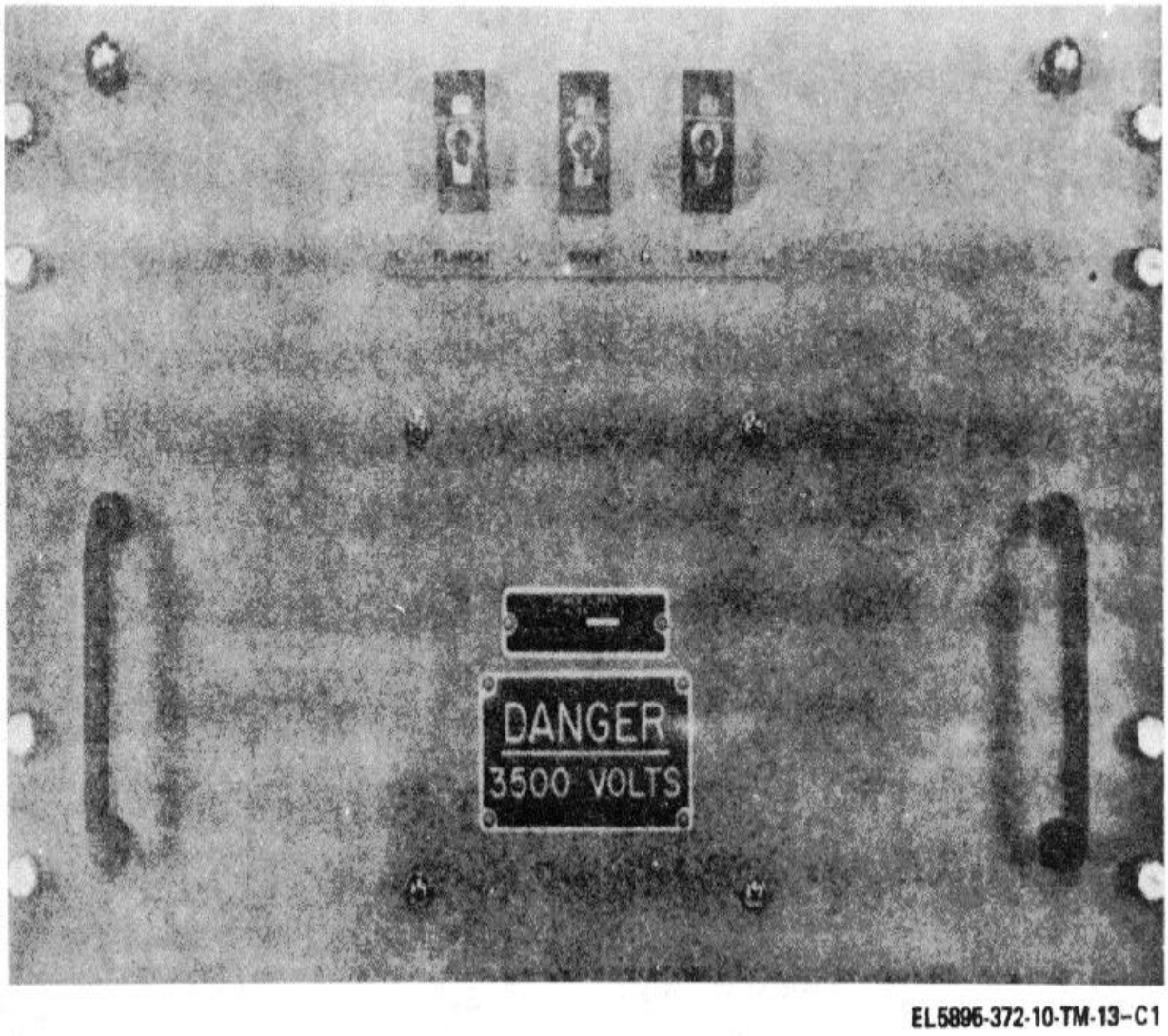


Figure 2-6. Hvps, controls, indicators and connectors

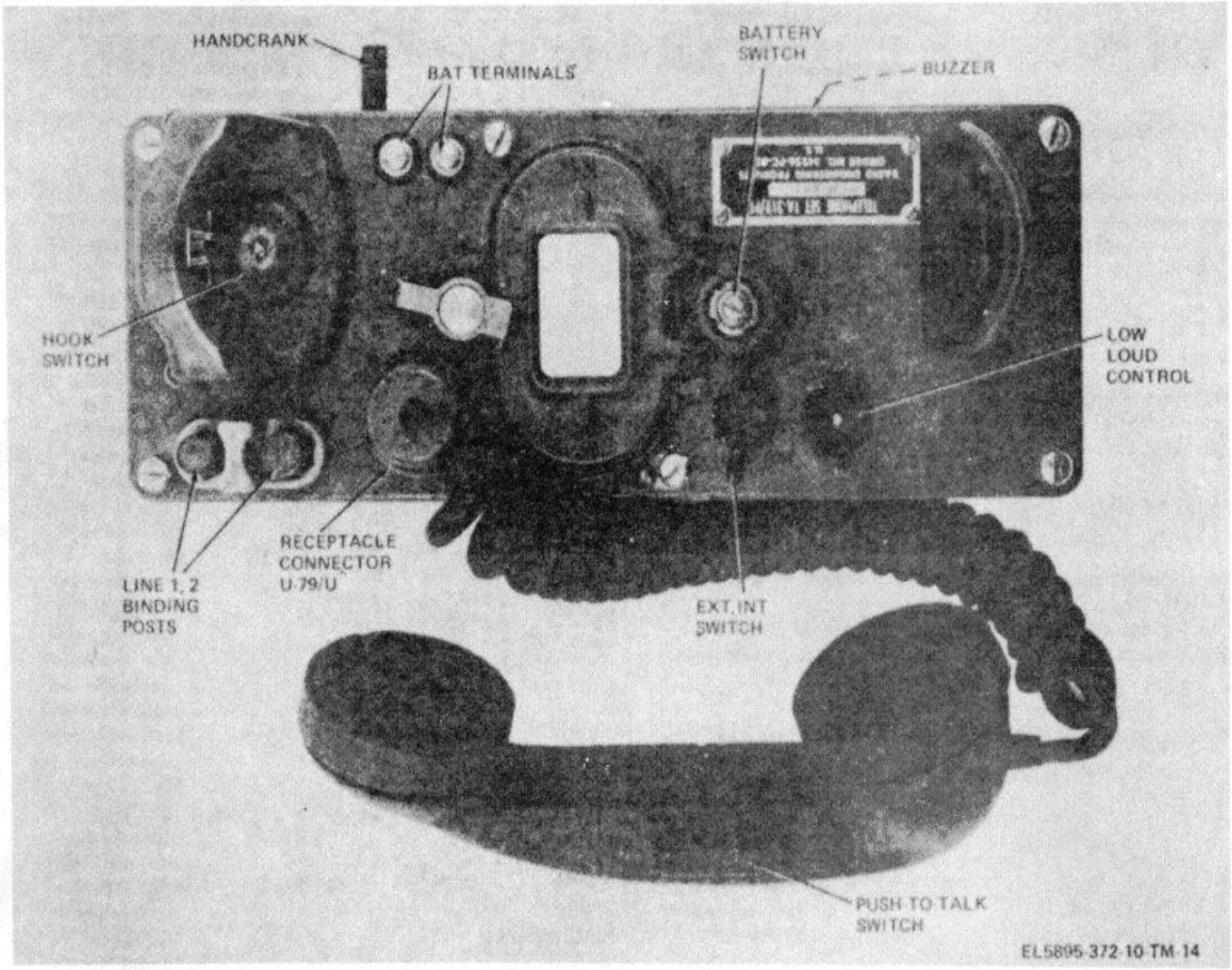


Figure 2-7. Telephone, controls, indicators and connectors.

Table 2-6. Hvps, Controls, Indicators, and Connectors (fig. 2-6)--Continued

Control, indicator or connector,	*Function*
ments and hvps blower; also provides overload protection.	
600V circuit breaker	When set to ON, applies primary ac power to +600 vdc power supply circuits and provides overload protection.
3500V circuit breaker	When set to ON, applies primary ac power to +3500 vdc power supply circuits and provides overload protection.

Table 2-7. Telephone, Controls, Indicators, and Connectors (fig. 2-7)

Control, indicator or connector	*Function*
Hook switch	Connects handset to line during operation. Switch is operated when handset is removed from retaining cradle and is open when handset is in retaining cradle.
LINE 1, 2 binding posts	Provide connections for two conductor telephone lines.
Handcrank	Generates ringing signal when turned.
BAT terminals	Provide connections for external three-volt dc power source.
Receptacle Connector U-79/U	Provides connection for handset.
Battery switch (three-position)	Connects internal circuits for particular type of service to be used:

Switch Position	*Function*
CB	Common battery operation
LB	Local battery operation
CBS	Common battery signaling (local battery for voice)

EXT-INT switch	Selects either the handset in the INT position or secure comm. handset/headset in the EXT position for use in the circuit.
LOW-LOUD control	Adjusts volume of internal buzzer.
Buzzer	Provides audible indication of incoming call or disconnect.
Push-to-talk switch	When depressed, permits voice transmission; when released permits voice reception.

Table 2-8. Digital Counter, Controls, Indicators, and Connectors (fig. 2-8)

Control, indictor or connector	*Function*
RF INPUT connector	Connects RF count signal from rt unit to digital counter.
STANDARD FREQ OUT connector	Provides standard frequency signal to calibrate external equipment.
FREQ A connector	Accepts external signal for frequency and frequency-ratio measurements, for totalizing, and for obtaining scaled outputs a STANDARD FREQ OUT connector when FUNCTION switch is set to SCALE A.
SENSITIVITY switch	Selects source of input signal in frequency, frequency ratio (numerator), and totalizing modes of operation.

Switch Position	*Function*
.1 V to 100 V	Signals applied to FREQ A connector are attenuated in decade steps and routed to channel A.
PLUG-IN	When optional plug-in converter is used, input signal connected to the converter is routed thru the converter to channel A.
TEST	Self-tests digital counter.
FREQ C	Input signal connected to CAC or CDC connectors is applied to channel C and counted.

Channel B SLOPE switch	Selects either positive or negative slope of channel B input signal for triggering digital counter to provide start and stop signals in period and frequency-ratio measurements and to provide start signals in time-interval (TIME B→C) measurement.
Channel C SLOPE switch	Selects either positive or neg-

Table 2-8. Digital Counter, Controls, Indicators, and Connectors (fig. 2-8--Continued

Control, indicator or connector	*Function*
	ative slope of input B or C signal for triggering channel C when mode selector switch is set to COM and signal C is selected when that switch is set to SEP.
Channel B trigger volts control (red)	Selects any voltage from +6 volts to - 6 volts which when multiplied by setting of channel B multiplier control determines exact triggering point of channel B input signal zero, triggering point will be zero voltage point.
Channel B multiplier switch (black)	Selects attenuation factor for channel B input signal.
Channel C trigger volts control (red)	Selects any voltage from +6 volts to -6 volts which when multiplied by setting of channel C multiplier switch determines exact triggering point of channel C input signal is set to zero, triggering point is the zero voltage point.
Channel C multiplier switch (black)	Selects attenuation factor for channel C input signal.
Mode switch	In SEP (separate) position, connects input C signal to channel C. In COM (common) position, connects input B signal to channel C.
Channel B AC connector	Accepts external signal for period, frequency-ratio, and time-interval measurements; connector provides capacitive coupling.
Channel B DC connector	Accepts external signal for period, frequency-ratio, and time-interval measurements; connector provides direct coupling.
Channel C AC connector	Accepts external signal for frequency measurement, frequency-ratio measurement, totalizing, or for scaling. When mode selector switch is set to SEP, signal applied to connector is capacity-coupled to channel C.
Channel C DC connector	Accepts external signal for frequency measurement, frequency-ratio measurement, totalizing, or scaling. When mode selector switch is set to SEP, signal applied to connector is coupled directly to channel C.

Table 2-8. Digital Counter, Controls, Indicators, and Connectors (fig. 2-8 Continued

Control, indicator or connector	*Function*
Digital display	Indicates numerical results of measurement with automatically positioned decimal point; includes an annunicator that indicates units of measurement (μS, MS, SEC, MC, and KC).
FUNCTION switch	Selects measurement or scaling mode of operation in conjunction with positions of SENSITIVITY switch and time base switch.
STD FREQ OUT switch (red)	Selects standard frequency output (10 (10-', 1, 10, 10', 10^3, 10^4, 10^5, 10^6, and 10^7 cps) that appears at STD FREQ OR SCALE OUT connector when FUNCTION switch is set to TIME B→C, FREQ, MAN STOP, or MAN START.
Time base switch (black)	a. Selects CLOCK FREQ (1, 10, 10^2, 10^3, 10^4, 10^5, 10^6, and 10^7 cpsl that is counted in period and time-interval measurement; 10^{-1} and 10^8 switch positions are not used; b. Selects GATE TIME for frequency measurements; c. Selects SCALER RATIO of 10, 10^2, 10^3, 104, 10^5, 10^6, 10' and 10^8 by which frequency of signal applied to FREQ A input connector is divided when FUNCTION switch is set to SCALE A (10^{-1} and 1 positions are not used). Scaled signal is available at STD FREQ OR SCALE OUT connector. d. Selects frequently ratio measurement when set to the 10^8 position and with the FUNCTION switch set to 1, 10 10^2, 10^3, 10^4 and 10^5. Time base switch, in conjunction with FUNCTION switch position, selects unit of measurement and decimal point displayed in frequency, period, and time-interval measurements.
RESET switch	Permits manual reset of count to zero and start of new count.
GATE indicator	Lights (green) when count gate is open and pulses can be counted.
DISPLAY control	Increases length of time count is displayed as control is rotated from the MIN posi-

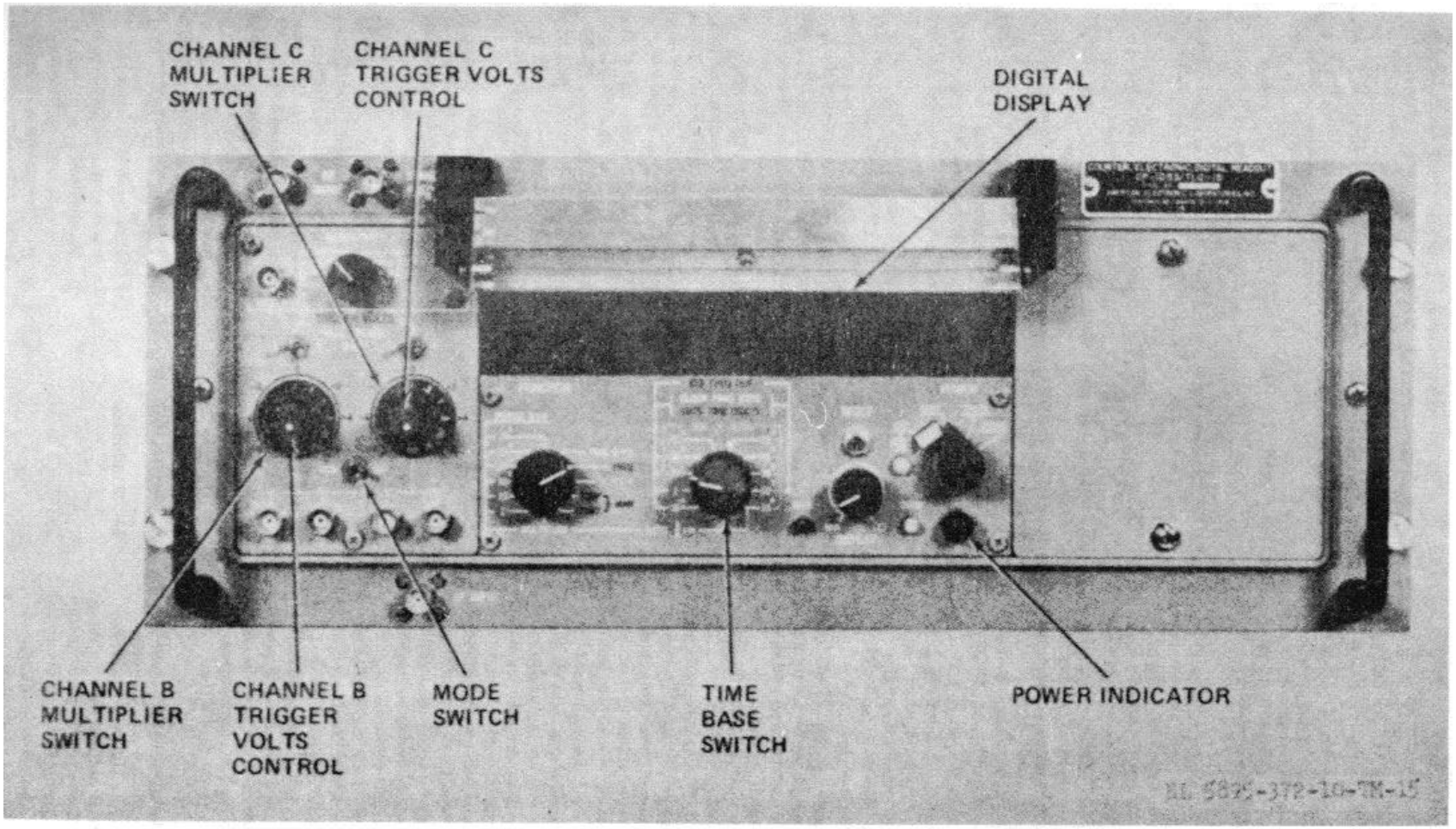


Figure 2-8. Digital counter, controls, indicators and connectors.

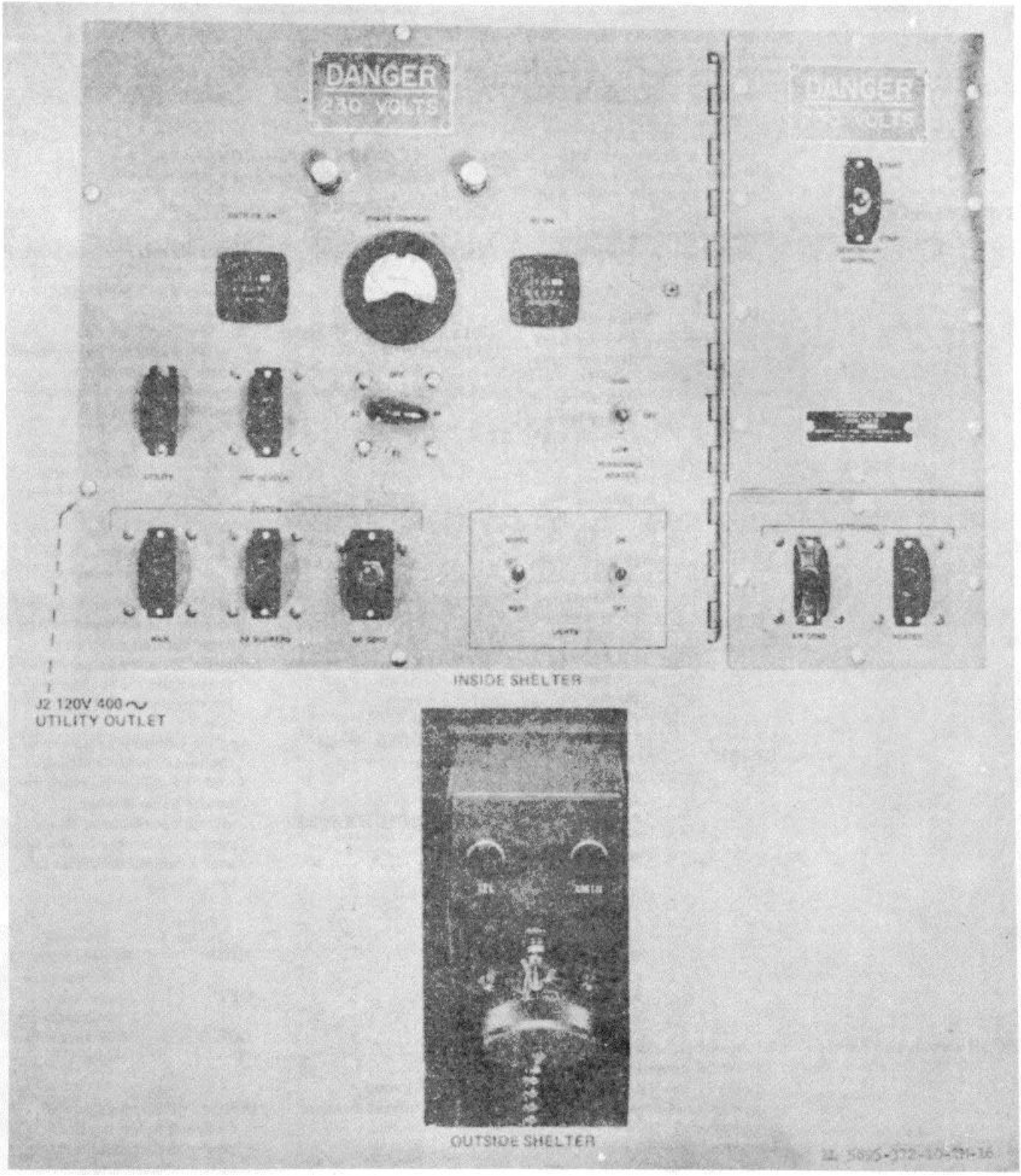


Figure 2-9. Power distribution box, controls, indicators and connectors.

Table 2-8. Digital Counter, Controls, Indicators, and Connectors (fig. 2-8)--Continued

Control, indicator, or, connector	*Function*
	tion clockwise. Measurement automatically recycles after the display time. When switched to the extreme clockwise = position, count is displayed until RESET switch is depressed. DISPLAY control is not effective in totalizing operation.
POWER switch	Selects operating mode of digital counter as follows:

Switch Position	*Function*
OFF	When set to OFF by first depressing PUSH switch, all power is removed from digital counter.
STBY	Applies power to rf oscillator only.
TRACK	Applies power to all digital counter circults and digital display shows continuous display of changing count.
STORE	Applies power to all digital counter circuits and digital display remains constant during count and changes only when final count changes after any gate period.

PUSH switch and bar	When switch is depressed, POWER switch can be set to OFF power is not unintentionally removed.
OVEN indicator	Indicates (yellow) when crystal oven heater in RF oscillator is energized with POWER switch set to STBY, TRACK, or STORE.
Power indicator	Indicates (red) application of 115 vac power to counter with POWER switch set to STBY, TRACK, or STORE.
AF INPUT connector	Connects audio output of rt unit to digital counter.

Table 2-8. Digital Counter, Controls, Indicators, and Connectors (fig. 2-8)--Continued

Control, indicator or connector	*Function*

Table 2-9. Power Distribution Box, Controls, Indicator and Connectors (fig. 2-9)

Control, indicator or connector	*Function*
XMTR FIL ON meter	Indicates total time in hours and tenths that filament power has been applied to the rfa.
PHASE CURRENT group meter	Monitors current flow of the three-phase primary power from the generator.
Switch (four-position)	Selects ac power phase to be current monitored:

Switch Position	*Measurement*
OFF	Disconnects meter from circuit.
∅1	Phase 1 ac
∅2	Phase 2 ac
∅3	Phase 3 ac

RT ON meter	Indicates total time in hours and tenths that power has been applied to rt unit.
UTILITY circuit breaker	Applies primary ac power to shelter utility outlets and provides overload protection.
PREHEATER circuit breaker	Applies primary ac power to preheater relay contacts and one side of heating ele ments in preheater.
PERSONNEL HEATER switch	Controls operation of the personnel heater in the operator's compartment as follows:

Switch Position	*Function*
HIGH	Selects high fan speed.
OFF	Stops fan operation.
LOW	Selects low fan speed.

SYSTEM group MAIN circuit breaker	Applies primary ac power from generator to main power distribution system of the shelter and provides overload protection.
30 BLOWERS circuit breaker	Applies primary ac power to exhaust assembly fans and provides overload protection.

Table 2-9. Power Distribution Box, Controls, Indicators and Connectors (fig. 2-9)—Continued

Control, indicator or connector	*Function*
DC CONV circuit breaker	Applies primary ac power to +28 vdc converter and provides overload protection.
LIGHTS group	
WHITE RED switch	Selects white or red shelter dome lighting.
ON OFF circuit breaker	Applies primary ac power for shelter dome lighting.
GENERATOR CONTROL	Provides remote control of switch

Switch Position	*Function*
START	Starts generator.
RUN	Normal operating position for generator.
STOP	Stops generator.

PERSONNEL group	
AIR COND circuit breaker	Applies primary ac power to vides overload protection.
HEATER circuit breaker	Applies primary ac power to personnel heater and provides overload protection.
J2 120V 400 -utility outlet	Provides 120 vac, 400 Hz one phase for utility power.
POWER connector (outside shelter)	Permits connection of main ac power cable from generator to power distribution box on shelter.
GND connector (outside shelter)	Permits connection of main ground cable to shelter ground system.

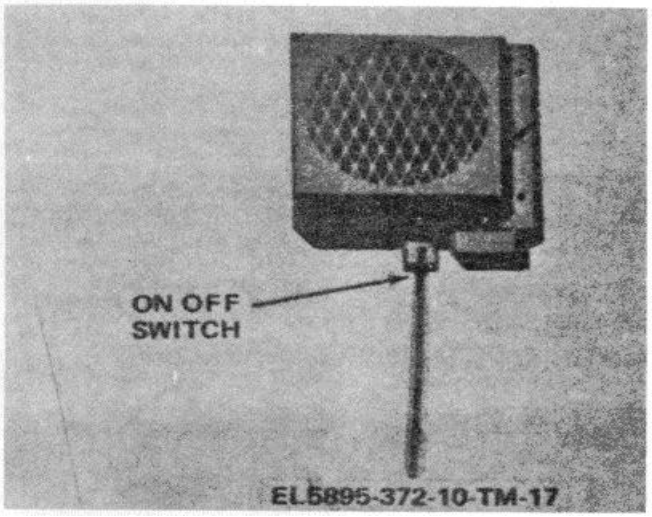


Figure 2-10. Personnel fan, controls, indicators and connectors.

Table 2-9. Power Distribution Box, Controls, Indicators and Connectors (fig. 2-9)--Continued

Control, indicator or connector	*Function*
TEL XMTR building posts (outside shelter)	Permits connection of remote telephone line to the shelter.

Table 2-10. Personnel Fan, Controls, Indicators and Connectors (fig. 2-10)

Control, indicator or connector	*Function*
On-off switch (chain operated)	Controls application of primary power to fan. When chain is released, fan is turned on.

Table 2-11. Air-Conditioner, Controls, Indicators, and Connectors (fig. 2-11)

Control, indicator or connector	*Function*
DECREASE/INCREASE thermostat control	Regulates cooling and heating temperature of operator's compartment.
HI SPEED-LO SPEED switch	Controls fan speed and pro-
Mode switch (five position)	Selects air-conditioner mode of operation as follows:

Switch Position	*Function*
LO-HEAT	Fan motor is energized; heater capability of air-conditioner is set for minimum output temperature.
OFF	Removes primary power from air-conditioner.
VENTILATE	Fan motor is energized.
COOL	Both fan and compressor motors are energized. Operation of air conditioner is thermostatically controlled.
HI-HEAT	Fan motor is energized; heater capability of air conditioner is set for maximum output temperature.

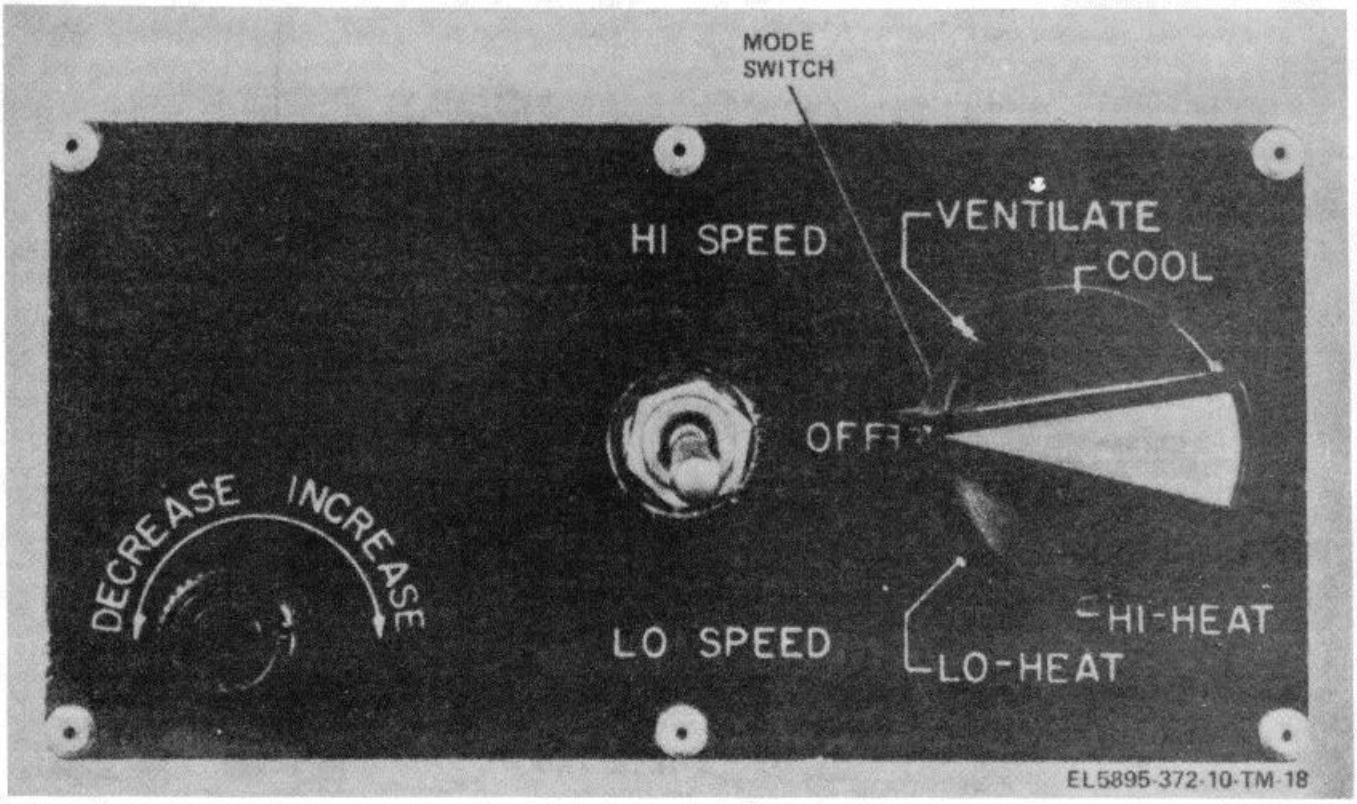


Figure 2-11. Air-conditioner, controls, indicators and connectors.

Table 2-12. Modulation Source, Controls, Indicators and Connectors (fig. 2-12)

Control, indicator or connector	*Function*
VOICE switch	a. Switch. When set to on position, selects voice modulation circuits for use in rt unit. b. Indicator(white). Indicates that VOICE switch is set to off position. c. Indicator(green). Indicates that VOICE switch is set to on position.
NOISE switch	a. Switch. When set to on position selects noise modulation for use in rt unit. b. Indicator(white). Indicates that NOISE switch is set to off position. c. Indicator(green). Indicates that NOISE switch is set to on position.
TONES switch	a. Switch. When set to on position, selects tone modulation for use in rt unit. b. Indicator(white). Indicates that TONES switch is set to off position. c. Indicator(green). Indicates that TONES switch is set to on position.
EXTERNAL MOD switch	a. Switch. When set to on position, enables external modulation signal to be used by rt unit. b. Indicator(white). Indicates that EXTERNAL MOD switch is set to off position. c. Indicator(green). Indicates that EXTERNAL MOD switch is set to on position.
MOD OFF switch	a. Switch. When set to on position, turns off or resets voice, noise, tone, and external modulation functions. b. Indicator(white). Indicates that MOD OFF switch is set to off position. c. Indicator(green). Indicates that MOD OFF switch is set to on position.
NOISE BW KC/S switch	Selects noise bandwidth of 3.5

Table 2-12. Modulation Source, Controls, Indicators and Connectors (fig. 2-12)-Continued

Control, indicator or connector	*Function*
	kHz, 30 kHz, or 80 kHz to be used in the noise generator circuit.
NIT RATIO control.	Adjusts ratio of combined noise and tone signals.
TONE SEL KC/S switch.	Selects one of three variable tone frequency ranges or one of three fixed tone frequencies.
EXT MOD connector.	Provides for external modulation input.
MICROPHONE connector.	Provides for microphone connection which is used for voice modulation.
SPEED WPM-CPS control.	When random keying, adjusts output between 10 and 30 words-per-minute. When in periodic keying, adjusts output between 10 and 30 Hz.
RANDOM RATIO control.	Adjusts ratio of dots and dashes from the cw generator.
TONE FREQ KC/S control.	Used in conjunction with three variable frequency ranges of TONE SEL KC/S switch.
PWR switch.	Controls application of primary power to modulation generator.
HAND KEY connector.	Adapts hand keying mechanism for hand keying operation of transmitter.
CONT KEYING switch	a.. Switch. When set to on position, selects continuous keying mode for rt unit. b. Indicator(white). Indicates that CONT KEYING switch is set to off position. c. Indicator(green). Indicates that CONT KEYING switch is set to on position.
PERIODIC KEYING switch	a. Switch. When set to on position, selects periodic keying mode for rt unit. b. Indicator(white). Indicates PERIODIC KEYING switch is set to off position. c. Indicator(green). Indicates PERIODIC KEYING switch is set to on position.
RANDOM KEYING switch	a. Switch. When set to on position, selects random keying mode for rt unit. b. Indicator(white). Indicates RANDOM KEYING switch is set to off position. c. Indicator(green). Indicates RANDOM KEYING switch is set to on position.
HAND KEYING switch	a. Switch. When set to on position, selects hand keying mode for rt unit. b. Indicator(white). Indicates

Table 2-12. Modulation Source, Controls, Indicators and Connectors (fig. 2-12)--Continued

Control, indicator or connector	*Function*
	HAND KEYING switch is set to off position. c. Indicator(green). Indicates HAND KEYING switch is set to on position.

Table 2-13. Pan Indicator, Controls, Indicators and Connectors (fig. 2-13)

Control, indicator or connector	*Function*
Crt	Provides visual display.
HORIZ POSITION control	Adjusts horizontal position of display.
HORIZ GAIN control	Adjusts length of horizontal trace of display.
SWEEP WIDTH MULTIPLIER control	Selects sweep width multiplication factor to increase or decrease displayed pulse width.
CENTER FREQUENCY control	Positions center frequency signal on display screen.
VERTICAL POSITION control	Adjusts vertical position of display.
FOCUS control	Adjusts focus of display.
INTENSITY control	Adjusts brightness of display.
SWEEP RATE control	Adjusts sweep rate of display to vary number of displayed pulses.
TRANSMITTED SIG AM control	Adjusts amplitude of transmit pulse on display.
RECEIVED SIG AM control	Adjusts amplitude of receive pulse on display.
POWER INPUT switch	Controls application of primary power to pan indicator.

Table 2-14. Secure Comm Mic Amplifier, Controls, Indicators, and Connectors (fig. 2-14)

Control, indicator or connector	*Function*
POWER SWITCH	Controls application of primary power to secure comm mic amplifier.
Power indicator	Lights red when POWER SWITCH is set to ON.
VOLUME control	Adjusts gain of audio output.
J1 connector	Permits connection of power and encoder/decoder to secure comm mic amplifier.
J2 connector	Permits connection of handset to secure comm mic amplifier.
J3 connector	Permits connection of remote handset to secure comm mic amplifier.

Table 2-15. Secure Comm Speaker Amplifier, Controls, Indicators, and Connectors (fig. 2-15)

Control, indicator or connector	*Function*
AUDIO connector	Permits connection of comm radio set audio to secure comm speaker amplifier.

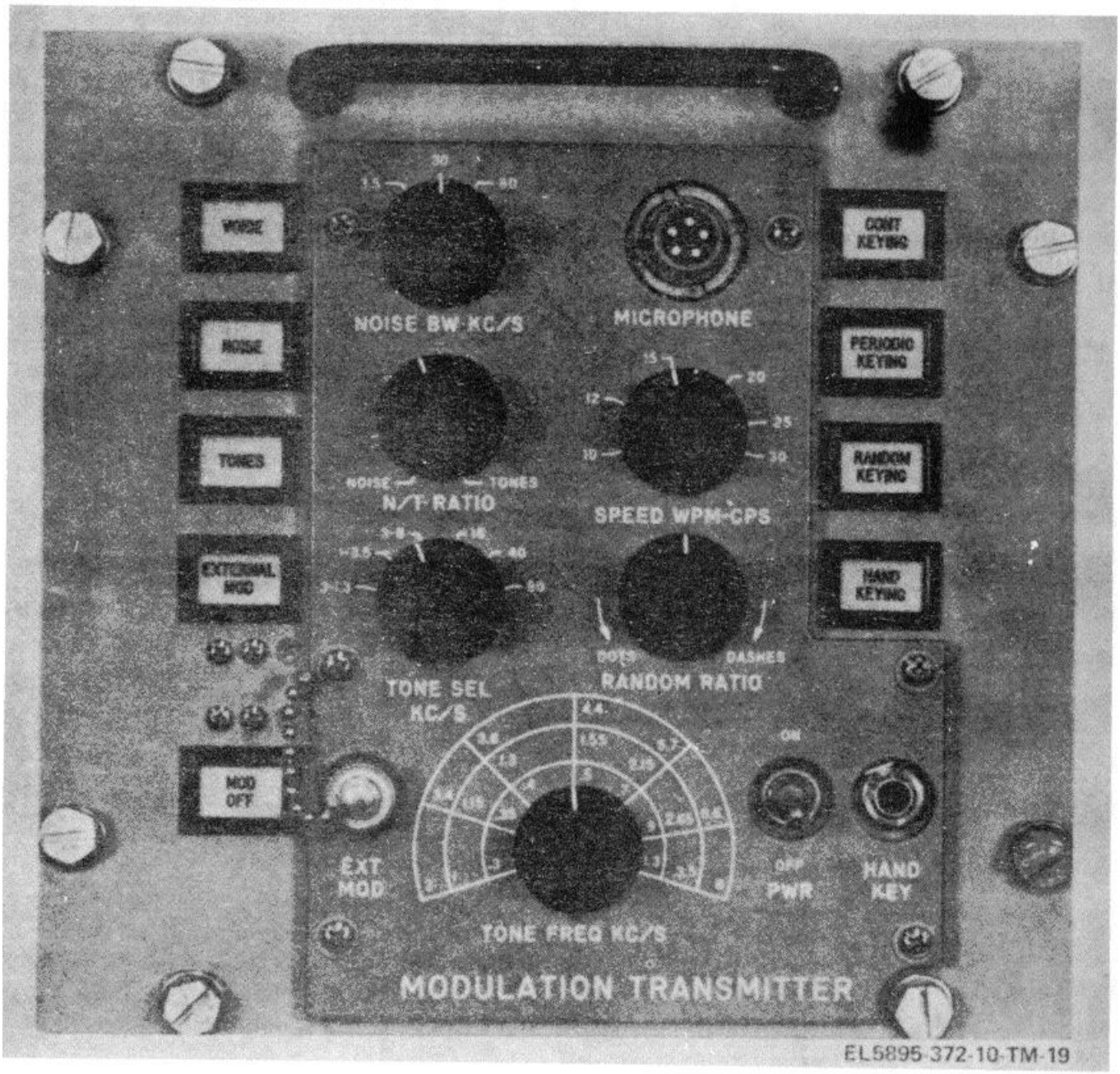


Figure 2-12. Modulation source, controls indicators and connectors

Table 2-15. Secure Comm Speaker Amplifier, Controls, Indicators, and Connectors (fig. 2-15)-Continued

Control, indicator or connector	*Function*
POWER connector	Permits connection of power to secure comm speaker amplifier.
Power indicator	Glows red when ON-OFF switch is set to ON.
ON-OFF switch	Controls application of primary power to secure comm speaker amplifier.

Table 2-16. Comm Control Unit, Controls, Indicators, and Connectors (fig. 2-16)

Control, indicator or connector	*Function*
Power switch	Controls application of primary power to comm control unit.
POWER ON indicator	Indicates power is applied to comm control unit.

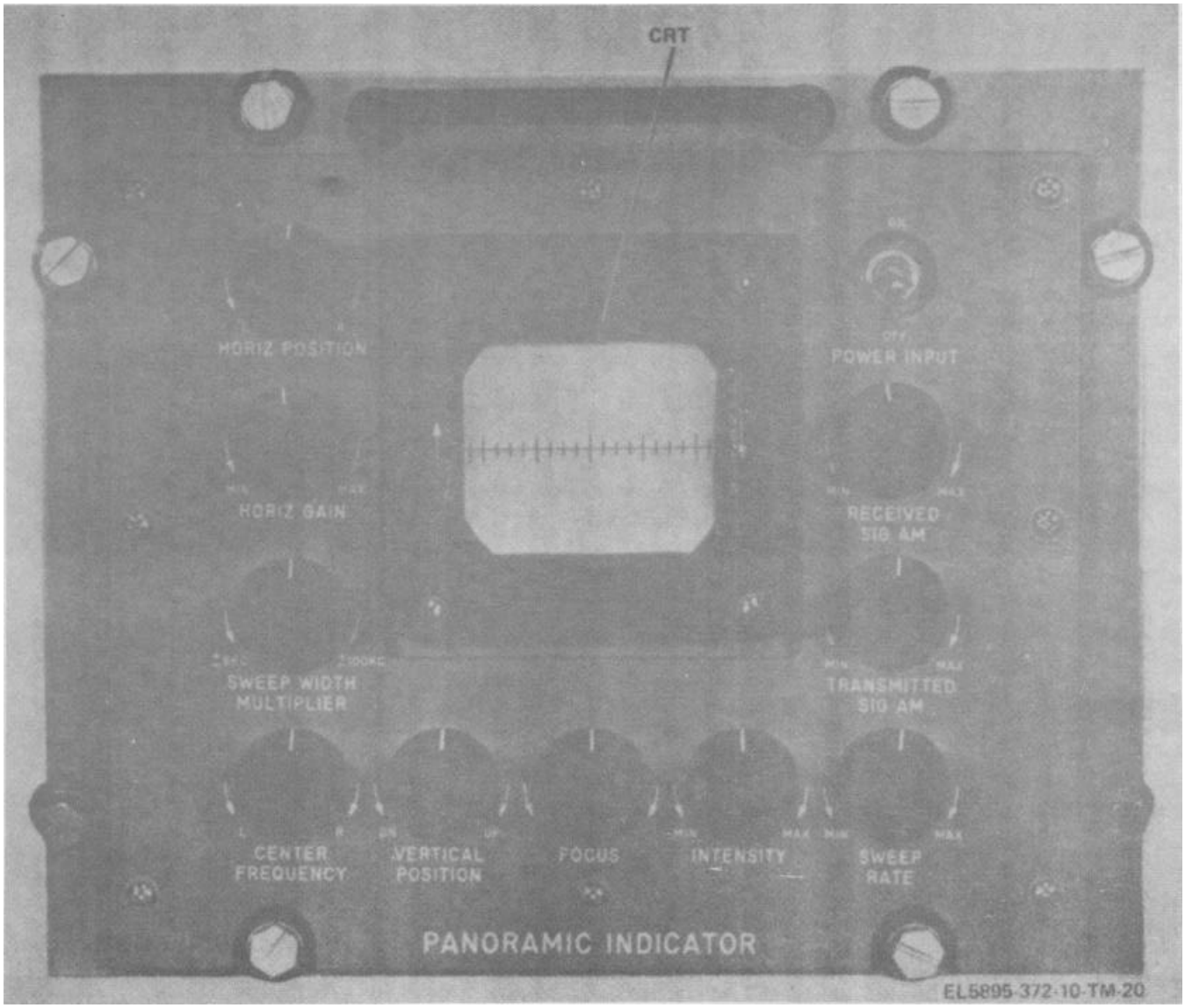


Figure 2-13. Pan indicator, controls, indicators and connectors.

Table 2-16. Comm. Control Unit, Controls, Indicators, and Connectors (fig. 2-16)-Continued

Control, Indicator or Connector	*Function*
PLAIN indicator	Indicates PLAIN CIPHER switch is set to PLAIN.
PLAIN-CIPHER switch	
Switch Position	*Function*
PLAIN	Permits unsecure communications on comm radio set.
CIPHER	Permits secure communications on comm radio set.

Table 2-16. Comm Control Unit, Controls, Indicators, and Connectors (fig. 2-16)-Continued

Control, indicator or connector	*Function*
CIPHER indicator	indicates PLAIN CIPHER switch is set to CIPHER.
ZEROIZE switch	Renders associated secure equipment inoperative.

Table -17. Generator, Control, Indicators and Connector (fig. 2-17)

ENGINE group	
Elapsed time meter	Indicates total tme in hours that engine has been running.
PRESS gage	Monitors engine oil prey.
AMPERES meter	Monitors charging and discharging rate of engine battery.

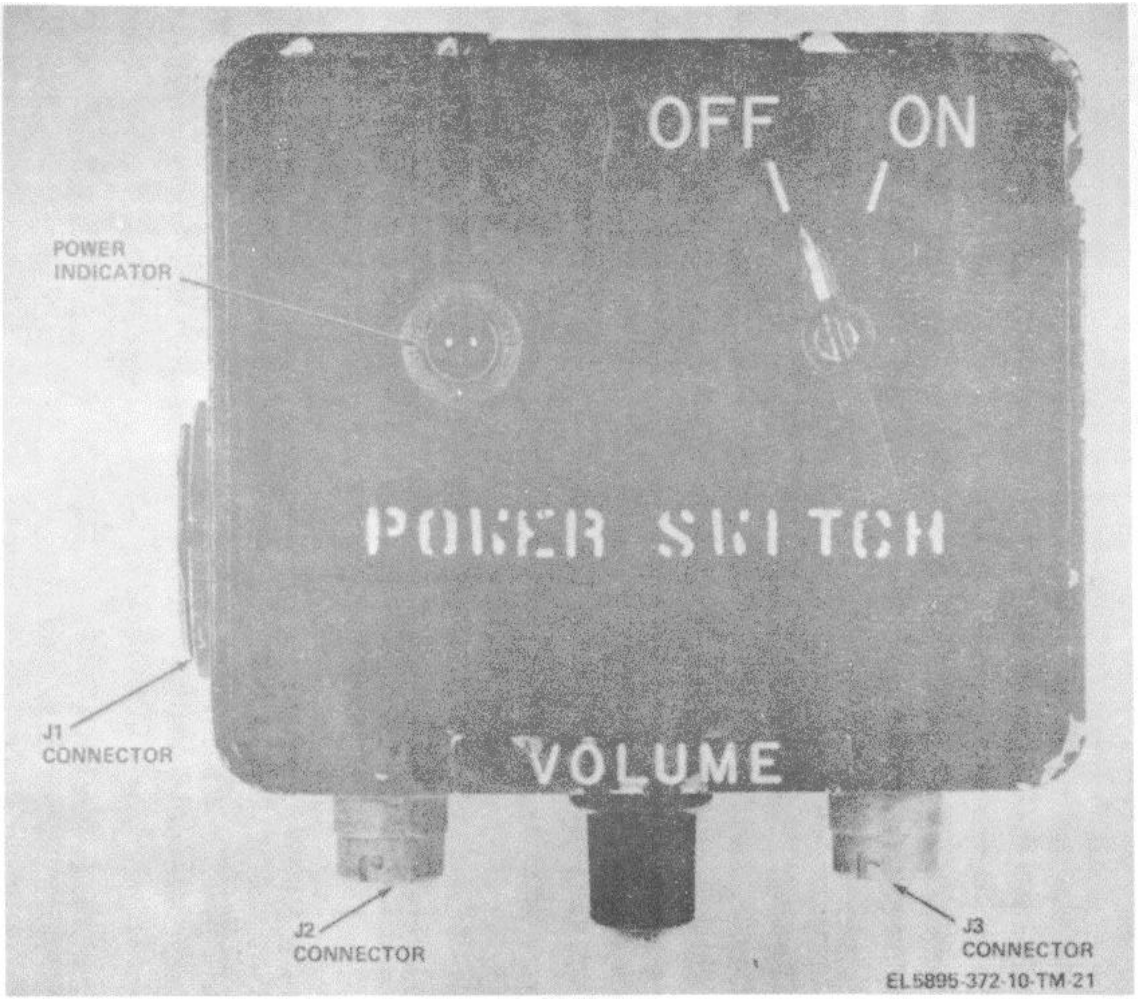


Figure 2-14. Secure comm mic amplifier, controls, indicators and connectors.

Table 2-17. Generator, Controls, Indicators and Connectors (fig. 2-17)-Continued

Control Indicator or connector	*Function*
REMOTE-LOCAL switch	Permits operation of generator from either local or remote (shelter) position.
NORMAL EMER. RUN EMER.-STOP switch	Allows operating the engine in normal or emergency condition; permits stopping engine under emergency conditions.
START-STOP switch	Permits engine to be started or stopped from local position.
PANEL LIGHTS switch	Energizes the two front panel lights.
GENERATOR group VOLT. SEL. Switch (six-position)	Selects and permits monitoring the following on voltage meter:

Table 2-17. Generator, Controls, Indicators and Connectors , (fig. 2-17)-Continued

Control, indicator or connector	*function*	
	Switch Position	*Function*
	V0-1	Selects neutral and phase 1.
	V0-2	Selects neutral and phase 2.
	V0-3	Selects neutral and phase 3.
	V1-3	Selects phase 1 and phase 3.
	V1-2	Selects phase 1 and phase 2.
	V2-3	Selects phase 2 and phase S.
Voltage meter		Indicates generator voltage for phases selected by VOLT. SEL switch.

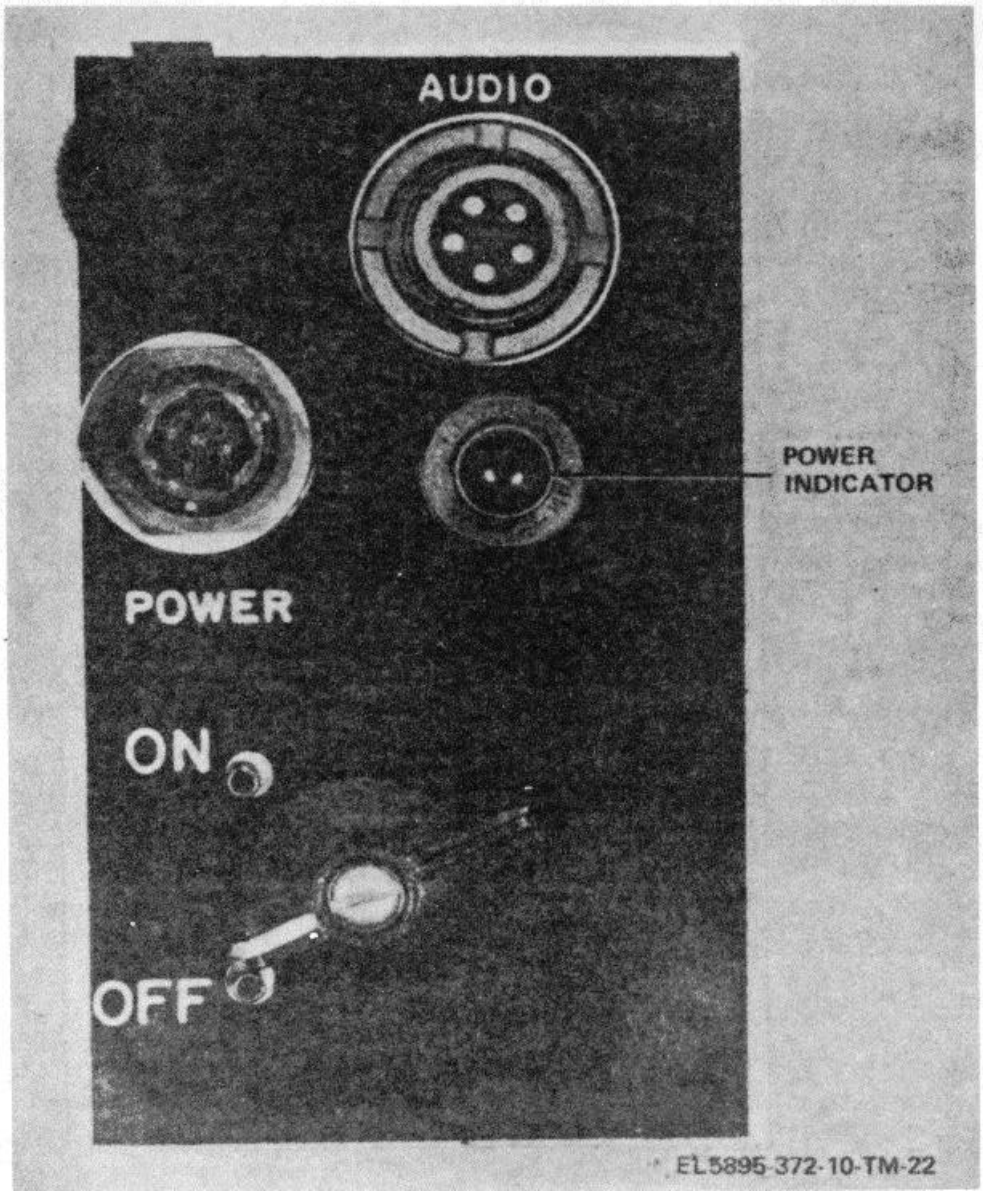


Figure 2-15. Secure comm speaker amplifiers, controls, indicators and connectors

Table 2-17. Generator, Controls, Indicators and Connectors (fig. 2-17)--Continued

Control, indicator or connector	*Function*
VOLT. ADJ. Control	Adjusts generator output voltage.
Frequency meter	Indicates generator output frequency.
AMP. SEL switch (three-position)	Selects and permits monitoring on current meter:

Switch Position	*Function*
I1	Selects phase 1 current.
12	Selects phase 2 current.
13	Selects phase 3 current.

Current meter	Indicates generator output current.
CIRCUIT BREAKER	Controls application of primary power to power distribution box in the shelter and provides overload protection.

Table 2-17. Generator, Controls, Indicators and Connectors (fig. 2-17)--Continued

Control, indicator or connector	*Function*

Switch Position	*Function*
12	Selects phase 2 current.
13	Selects phase 3 current.

Current meter	Indicates generator output current.
CIRCUIT BREAKER	Controls application of primary power to power distribution box in the shelter and provides overload protection.

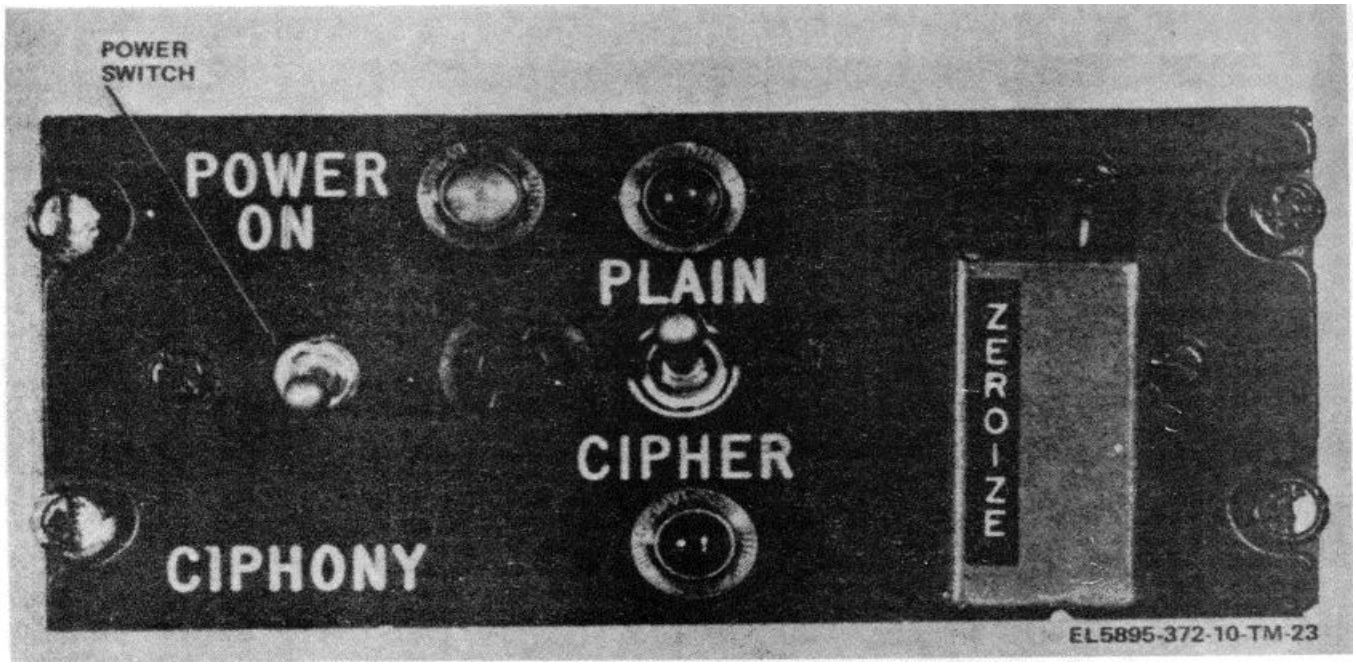


Figure 2-16. Comm control unit, controls, indicators and connectors

Table 2-18. Comm Rcvr, Controls, indicators and Connectors (fig. 2-18)

Control, indicator or connector	*Function*
ANT connectors (left and right)	Provide connections for coaxial cable to antenna.
BAND switch	Selects frequency band A or B.
CALL indicator	Indicates signal is received when LIGHT switch and SQUELCH switch are set to ON.
LAMP	Lights channel dial.
LIGHT switch	Controls power to dial lamp and CALL indicator.
Channel dial	Shows channel to which comm rcvr is tuned.
MC-TUNE control	Tunes Comm rcvr in 1-mc steps as indicated by channel dial.
KC-TUNE control	Tunes comm rcvr in 50-mc steps as indicated by channel dial.
POWER switch	Controls application of main power; turns off power in case of overload.
VOLUME control	Adjusts audio output.
SQUELCH switch	Selects types of squelch as follows:

Switch Position	*Function*
OLD-OFF	No squelch.
OLD-ON	Noise-operated squelch.

Table F18. Comm Rcvr, Controls, Indicators and Connectors (fig. 2-18)--Continued

Control, indicator or connector	*Function*
	Switch position / *Function*
	NEW-OFF / No squelch.
	NEW-ON / Squelch operated by tone from distant transmitter.
AUDIO connectors	Connections for audio accessories

Table 19. Comm Rt Unit, Controls, Indicators and Connectors (fig. 2-19)

Control, indicator or connector	*Function*
CALL indicator	Indicates signal is being received when LIGHT switch and SQUELCH switch are set to ON.
BAND switch	Selects frequency band A or B.
LIGHT switch	Controls power to dial lamp and CALL indicator.
SPEAKER switch	Turns speaker on and off.
ANT connector	Connection for antenna cable to comm rt unit.
LAMP	Lights channel dial.
Channel dial	Shows channel to which comm rt unit is tuned.
MC TUNE control	Tunes comm rt unit in 1-me steps as indicated on dial window.
KC TUNE control	Tunes comm rt unit in 60-kc

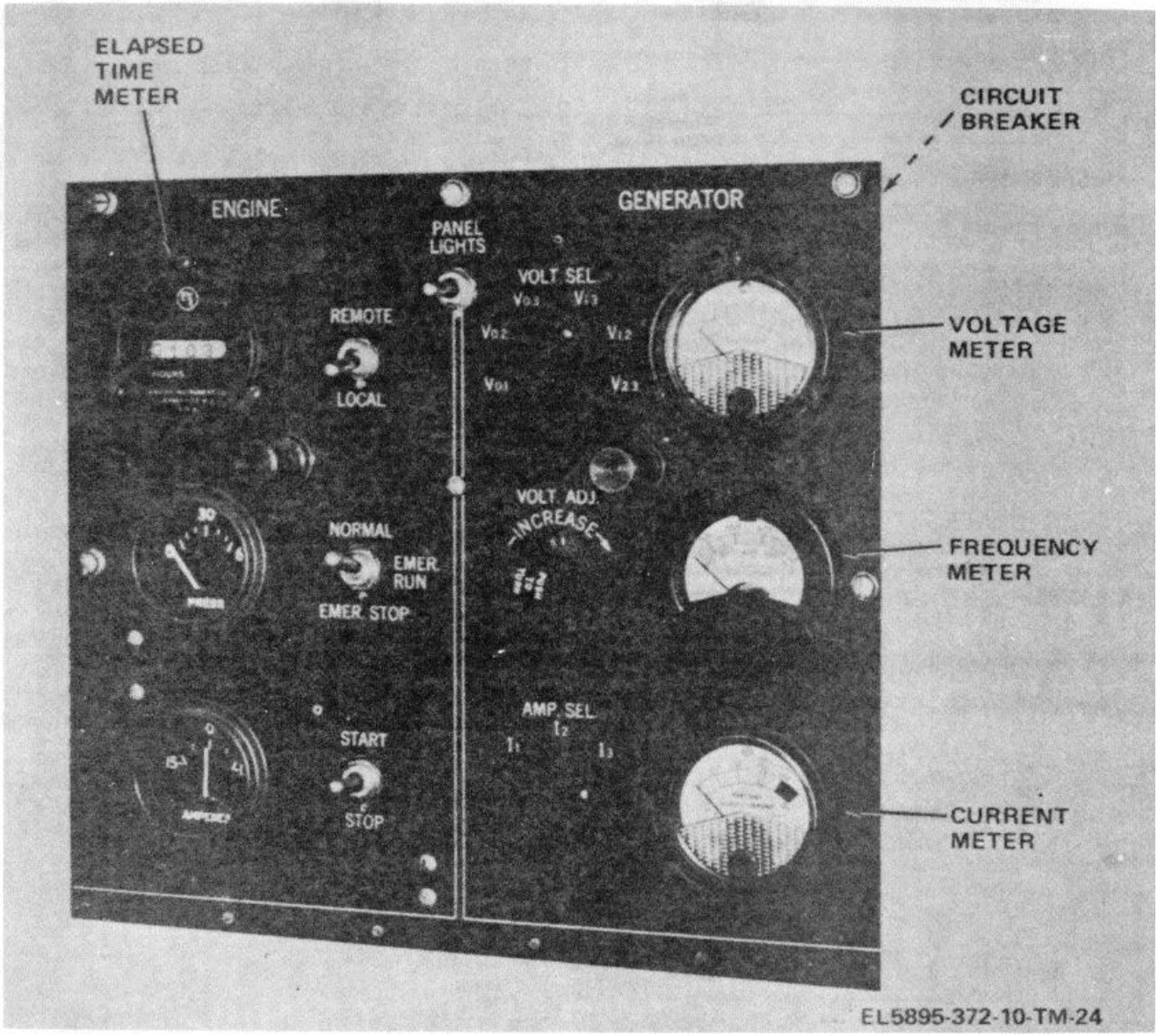


Figure 2-17. Generator, controls, indicators and connectors.

Table -19. Comm Rt Unit, Controls, Indicators and Connectors (fig. 2-19)--Continued

Control, Indicator or connector	*Function*
	steps as indicated on dial windown.
POWER switch	Controls application of main power to comm rt unit.
Switch Position	*Function*
OFF	Turns off
BREAK-ER-RESET	power to comm rt unit and resets circuit

Table 2-19. Comm Rt Unit, Controls, Indicators and Connectors (fig. 2-19)--Continued

Control. Indicator or connector	*Function*
Switch Position	*Function*
	breakers if tripped.
LOW	Turns receiver power on; transmitter has low out-put power.
HIGH	Turns receiver power on; transmitter

Table 2-19. Comm Rt Unit, Controls, Indicators and Connectors (fig. 2-19) - Continued

Control, indicator or connector	Function
	Switch Position / *Function*
	has high output power.
X-MODE Connector	Connection for cable to X-mode equipment.
SQUELCH switch	Selects types of squelch as follows:
	Switch Position / *Function*
	OLD-OFF / No squelch
	OLD-ON / Noise operated squelch.
	NEW-OFF / No squelch.
	NEW-ON / Squelch operated by tone from distant transmitter.
VOLUME control	Adjust Audio output
RETRANSMIT R/W MIKE connector	Connection for retransmission with certain others types of radio sets; connection for microphone.
SPKR MIKE connector	Connection for audio output or microphone input.
ANT CONT connector	Connection for control cable to comm rt unit.

Figure 2-18. Comm rcvr, controls, indicators, and connectors

Table 2-20. Remote Telephone Junction Box, Controls, Indicators and Connectors (fig. 2-20)

Control, indicator or connector	*Function*
LINE binding posts (two)	Used to connect telephone two-conductor cable.
TEL XMTR switch	Selects use of telephone or for operating transmitter from remote location.
TEL terminals (two)	Used to connect telephone.

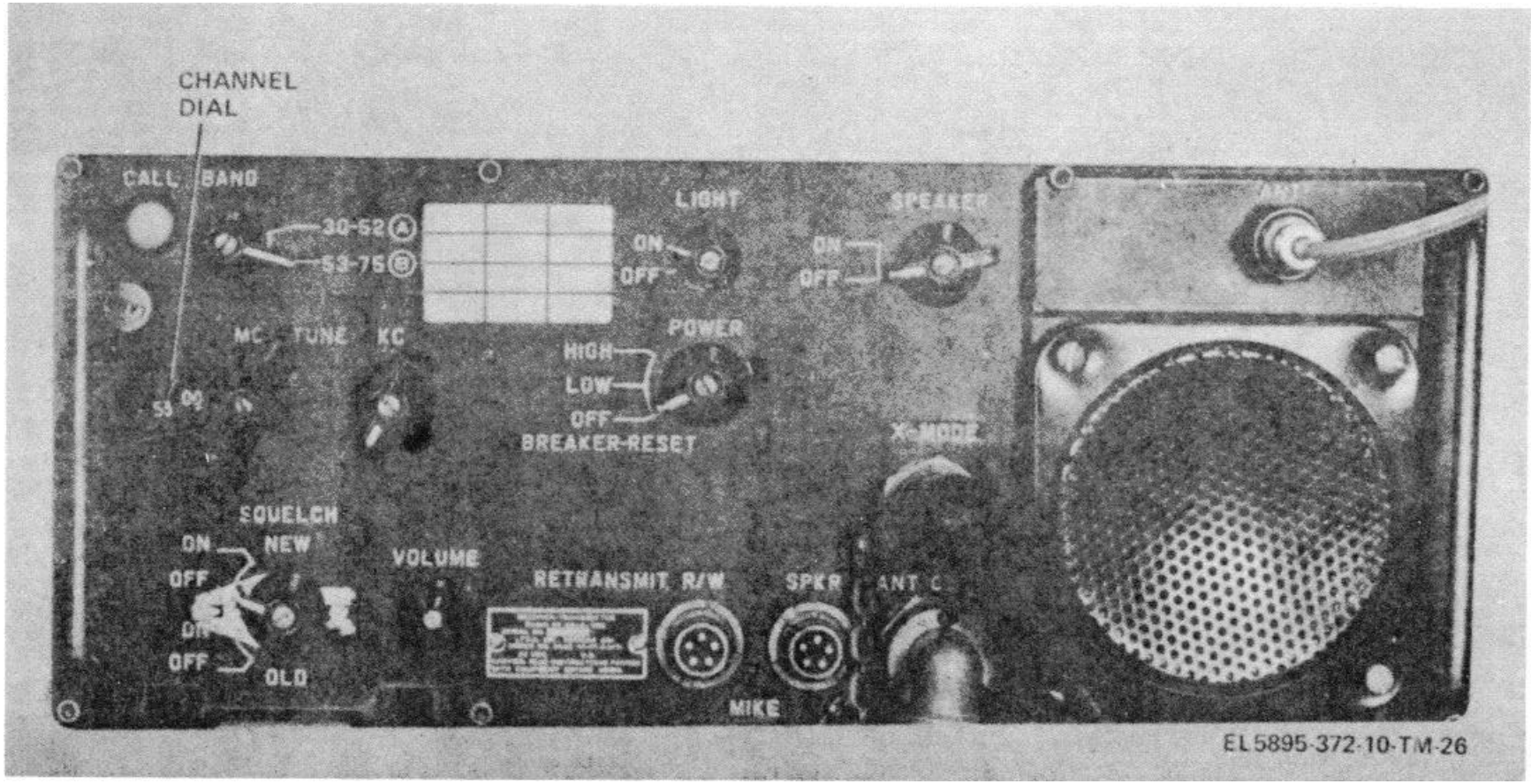


Figure 2-19. Comm rt unit, controls, indicators and connectors

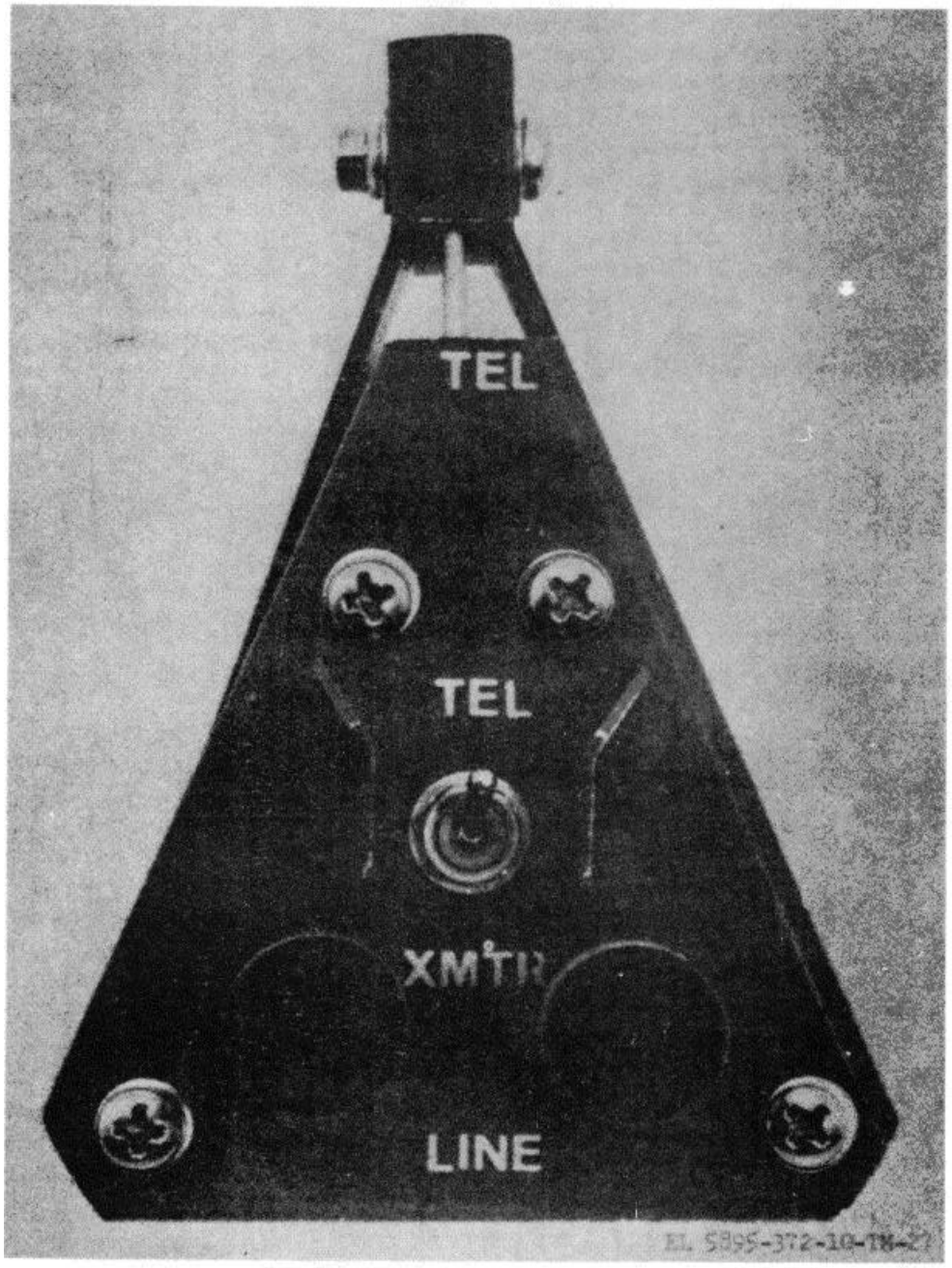


Figure 2-20. Remote telephone junction box, controls, indicators and connectors.

Section II. OPERATION UNDER USUAL CONDITIONS

2-4. Preliminary Starting Procedure

The following subparagraphs contain procedure that must be performed before starting the AN/TLQ-15. The procedures must be performed with the AN/TLQ-15 in shutdown status, and consist primarily of the presetting of control prior to starting the equipment to insure damage will not result when power is applied. It should be noted, that not all of the controls for each unit are listed. The controls which have not been listed my be set to any position for the preliminary starting procedure. Those units for which preliminary starting procedures are not required have also been omitted.

CAUTION

Before starting the equipment, perform the following preliminary procedures to avoid possible damage to the AN/TLQ-15.

CAUTION

Insure that rt unit TRANSMIT MODE switch is set to OFF before setting rt unit POWER ON switch to on (up). At temperatures of 32°F (0°C) or below, the rt unit should be allowed a warmup time of at least 5 minutes before moving TRANSMIT MODE switch from OFF position. Above 32°F (0°C) a warmup of at least 1 minute is required.

a. Power Distribution Box. Set controls as follows:

(1) Set following circuit breakers to off (out):

(a) UTILITY.
(b) PREHEATER.
(c) MAIN.
(d) 3d BLOWERS.
(e) DC CONV.
(f) AIR COND.
(g) HEATER.

(2) PHASE CURRENT switch to OFF.
(3) PERSONNEL HEATER switch to OFF.
(4) LIGHTS ON-OFF circuit breaker to OFF.

b. Control Unit. Set controls as follows:
(1) DIMMER CONTROL fully clockwise.
(2) PREHEATER switch to AUTO.
(3) AUDIO switch to OFF.

c. Modulation Source. Set PWR switch to OFF.

d. Pan Indicator. Set POWER INPUT switch to OFF.

e. Rt Unit. Set controls as follows:
(1) POWER ON circuit breaker to off (down).
(2) DIMMER control to midposition.
(3) METER SELECTOR switch to RF INPUT.
(4) DEVIATION control fully counterclockwise.
(5) AM MOD control fully counterclockwise.
(6) MODULATION switch to OFF.
(7) EXT AM MOD switch to OFF.
(8) ZERO BEAT switch to OFF.
(9) CHIRP RATE control to OFF.
(10) RF OUTPUT control fully counterclockwise.
(11) AFC switch to OFF.

CAUTION

The TRANSMIT MODE switch must be set to OFF before applying ac power to the rt unit.

(12) TRANSMIT MODE switch to OFF.
(13) SIJ THRESHOLD control to PRESET.
(14) BFO PITCH control to 0.
(15) RF GAIN control to AGC ON.
(16) IF BW switch to WIDE.
(17) AF GAIN control fully counterclockwise.
(18) Partially withdraw unit from equip- ment rack and be sure that EXT CAL switch is in the OFF position to install RF unit in equipment rack.

f. Digital Counter. Depress PUSH switch and simultaneously set POWER switch to OFF.

g. Lvps. Set following circuit breakers to ON:
(1) BIAS.
(2) +260.
(3) +700.

h. Hvps. Set controls as follows:
(1) FILAMENT circuit breaker to ON.
(2) 600 V circuit breaker to ON.
(3) 3500 V circuit breaker to ON.

i. Air Conditioner. Set mode switch to OFF.

j. Secure Comm Mic Amplifier. Set POWER SWITCH to ON and set VOLUME control to midposition. (Located in t-sec enclosure.)

k. Secure Comm Speaker Amplifier. Set ON OFF switch to ON.

l. Comm Control Unit. (Located on top of t-see enclosure.) Set controls as follows:
(1) POWER switch to ON (up).
(2) PLAIN-CIPHER switch to desired comm mode.

m. Encoder/Decoder. Set controls as follows:
(1) Power switch to ON.
(2) LOCAL-REMOTE switch to REMOTE.

NOTE

If encoder/decoder is not used, connect 1A18W6P1 to 1A18J9 and connect CX-11726/TLQ-15 to 1A18J10.

n. Personnel Fan. See that chain is pulled in to close fan door and that fan is not operating. o. Comm Rt Unit (In Trailer).

(1) If operating under blackout conditions, set LIGHT switch to OFF; if not under black conditions, set to ON.

(2) Set BAND switch to desired operating frequency band.

(3) Adjust MC TUNE and KC TUNE controls for desired frequency on channel dial.

(4) Set POWER switch to LOW if low output power mode is desired; if high output power mode is desired, set POWER switch to HIGH.

(5) Set SQUELCH switch to NEW ON (if desired).

(6) Set VOLUME control fully ccw.

(7) Set SPEAKER switch to OFF.

p. Comm Rcvr. Set controls as follows:

(1) If operating under blackout conditions, set LIGHT switch to OFF; if not, set to ON.

(2) Set BAND switch to desired monitoring frequency band.

(3) Adjust MC-TUNE and KC-TUNE controls for desired frequency.

(4) Adjust bandpass filter (on top of comm rcvr) tuning control to same as desired frequency.

(5) Set POWER switch to ON-RESET.

(6) Set VOLUME control to midposition.

(7) Set SQUELCH switch to NEW ON (if desired).

(8) Momentarily, set RESET switch (on exterior right side of comm RT unit housing) to MOMENTARY ON and release.

q. Generator. On the generator, set controls as follows:

(1) If operating under blackout conditions, set PANEL LIGHTS switch to off (down); if not under blackout conditions, set it to on (up).

(2) REMOTE-LOCAL switch to LOCAL.

(3) NORMAL EMER. RUN-EMER. STOP switch to NORMAL.

(4) START-STOP switch to START to crank engine.

(5) After generator engine starts, set REMOTE-LOCAL switch to REMOTE.

2-5. Preliminary Checks and Adjustments

Before attempting to operate the AN/TLQ-15, perform the following preliminary checks and adjustments.

a. Generator.

(1) Check engine oil pressure on PRESS gage; pressure should be approximately 30 pounds or greater.

(2) Check charge/discharge rate of engine battery system on AMPERES meter; meter should indicate slightly above 0 on the positive side.

(3) Set VOLT. SEL. switch to V1-3. Adjust VOLT. ADJ. control for 208 vac on voltage meter.

(4) Set VOLT. SEL. switch to V1-2 and V2-3. Voltage meter reads 208 vac at each position.

(5) Set VOLT. SEL. switch to V0-1 through V0-3. Voltage meter reads 120 vac at each position.

(6) Check that frequency meter indicate 400 (±25) Hz.

(7) Set AMP. SEL. switch to I1 through I3. Current meter reads 0%.

(8) Set CIRCUIT BREAKER to ON.

b. Equipment Cooling.

(1) Unlatch sliding door on each side of shelter.

(2) Slide each down to fully opened position.

2-6. Starting

The starting procedure for the AN/TLQ-15 consists of instructions for placing the equipment in operation and basic checks to ascertain that the equipment is operating properly. If erroneous indications or results are obtained during the procedure, refer to the troubleshooting procedure given in chapter 3 or request higher category maintenance.

a. Set WHITE-RED switch on power distribution box to RED (tactical conditions) or WHITE (nontactical conditions).

b. Set lights ON-OFF circuit breaker on power distribution box to ON.

c. Close both shelter doors.

d. Set MAIN circuit breaker on power distribution box to on (in).

e. Depress RESET switch on control, unit VOLTAGE PHASE FREQ indicator on control unit lights green. Control unit STANDBY switch lights white.

e1. Depress STANDBY switch on control unit. STANDBY switch lights green

f. Set VOLTAGE MONITOR switch on. control unit to positions Vϕ1 through Vϕ3. VOLTAGE MONITOR meter indicates in green area for each position.

g. Set following power distribution box circuit breakers to on (in):

(1) 3 Φ BLOWERS

(2) DC CONV.

(3) UTILITY.

(4) PREHEATER.

h. If operating in a relatively cold environment, set HEATER circuit breaker on power distribution box to on (in) and set PERSONNEL HEATER switch to HIGH or LOW. Set operator's thermostat for desired temperature.

i. If operating in a hot and humid environment, set AIR COND circuit breaker on power distribution box to on (in). Set air conditioner mode switch to COOL and set HI SPEED LO SPEED switch to desired position. Adjust DECREASE-INCREASE thermostat control for desired cooling temperature.

j. On control unit sequentially set switch as follows:

(1) STANDBY to on (green).

(2) DUMMY LOAD to on (green).

(3) ANTENNA COUPLER to off (white).

(4) AUX ANTENNA to off (white).

(5) REMOTE XMTR to off (white).

(6) HI RF-LOW RF to LOW RF.
(7) HIGH VOLTAGE to off (white).

k. Observe INTERLOCKS indicators on control unit. The following indicators should be lighted green.

(1) VOLTAGE PHASE FREQ.
(2) EQUIP. AIR.
(3) RFA RACK.
(4) LV PWR SUP RACK.
(5) HV PWR SUP RACK.
(6) ANT. COUPLER RACK.
(7) CONTROL UNIT RACK.
(8) RFA AIR.
(9) HV PWR SUP AIR.
(10) LP FILTER AIR.
(11) EQUIP. AIR TEMP.

CAUTION

Before performing the following steps, be sure that TRANSMIT MODE switch is set to OFF position.

(1). Set POWER ON circuit breaker on rt unit to on (up) and adjust intensity of panel lights to desired level using DIMMER control.

m. Set digital counter controls as follows: (1) POWER switch to STORE.

(2) DISPLAY control for desired display time.

(3) SENSITIVITY switch to .1V.

(4) Time base switch to GATE TIME (SEC-') 10.

(5) Function switch to FREQ.

n. On modulation source, set PWR switch to ON, MOD OFF switch to off (green) and CONT KEYING switch to on (green).

o. On pan indicator, set all controls to midrange and set POWER INPUT switch to ON. Adjust FOCUS, INTENSITY AND SWEEP RATE controls for optimum display.

p. After approximately 3 minutes delay (after setting STANDBY switch on), the following INTERLOCKS indicators on the control unit light (green):

(1) RFA FIL.
(2) IPA BIAS.
(3) FPA BIAS.
(4) DUMMY LOAD TEMP.
(5) SWR OVLD.

q. Depress rt unit FREQ LOCK switch to off (indicator off).

r. Adjust COARSE TUNING and FINE TUNING controls on rt unit for desired frequency. Depress FREQ LOCK switch to on (yellow).

CAUTION

Before proceeding allow sufficient rt unit warmup time. At or below 32 ℉ (0 ° allow at least 5 minutes; above this temperature, allow at least 1 minute.

s. Set rt unit TRANSMIT MODE switch to CONT.

t. Set BAND SELECT switch on rfa to desired frequency band.

u. Set BAND SELECT switch on softmounted coupler to desired frequency band.

v. Set HIGH VOLTAGE switch on control unit to on (yellow). The following INTERLOCKS indicators light (green):

(1) IPA PLATE.
(2) IPA SCREEN.
(3) FPA PLATE.
(4) FPA SCREEN.

w. Check all source voltages using VOLTAGE MONITOR switch and meter. All monitored voltages should read within green area on VOLTAGE MONITOR meter.

x. Set, wind, and start clock on control unit.

y. Check calibration of RECEIVED FREQUENCY MHz indicator on rt unit by observing frequency readout on digital counter. Both frequency readouts should coincide within +500 Hz.

z. Set HIGH VOLTAGE switch on control unit to off (white). The following INTERLOCKS indicators go out:

(1) IPA PLATE.
(2) IPA SCREEN.
(3) FPA PLATE.
(4) FPA SCREEN.

2-7. Operating Procedure

The normal operating procedures for the AN/ TLQ-15 are given in the following paragraphs. This includes a normal search procedure, a tuning procedure, a modulation/keying procedure and three transmitting procedures (look through, sij, and continuous transmit). In addition, instructions are provided for operating the shelter environmental systems, and the radio and telephone communications equipment.

2-8. Search and Tuning Procedures

This paragraph contains instructions for operating the receiving and transmitting sections of the AN/TLQ-15. The procedures are based on typical applications of the equipment.

a. Search Procedure. The search procedure is used to locate and identify signals within the frequency range of the AN/TLQ-15. All controls

and indicators referenced in the following procedure are located on the rt unit, unless otherwise indicated.

(1) Set TRANSMIT MODE switch to OFF and RECEIVE MODE switch to CW for initial search of unknown signals; set BFO PITCH control to 0. If desired signal modulation characteristics are known, set RECEIVE MODE switch to desired receiver detection mode (am, lsb, cw or usb).

(2) Set AFC switch to OFF.

(3) On control unit, set AUDIO switch to RCVR and set GAIN control fully clockwise.

(4) Adjust AF GAIN control on rt unit to obtain a suitable volume level from control unit speaker.

(5) Press FREQ LOCK switch to off (indicator goes out).

(6) If aux antenna is being used, set rfa BAND SELECT switch to band 5.

(7) Manually scan frequency spectrum, using COARSE TUNING control, until a signal of interest is detected. Detection will be in the form of a visual display located above the center line on the screen of pan indicator, and an audible indication will be heard (modulated signals only) from control unit speaker.

(8) Set ZERO BEAT switch to ON and adjust FINE TUNING control for a zero beat.

(9) Read and record the received signal frequency as displayed on rt unit RECEIVED FREQUENCY MHz indicator.

(10) Set AFC switch to NARROW.

(11) Observe TUNE HIGHER and TUNE LOWER indicators. If both indicators are out, proceed to (12) below. If either indicator is lighted, set AFC switch to OFF, retune receiver, and go back to (10) above.

(12) Determine and record transmission and modulation characteristics of signal, using audible and visual indications.

(13) Determine and record transmission and modulation characteristics of signal, using audible and visual indications.

b. Transmitter Tuning Procedure. After acquisition of a signal during the search procedure, the transmitting rfa section of the AN/TLQ-15 must be tuned to the signal frequency before entering one of the transmitting modes of operation. This procedure involves adjustment of the antenna couplers, and rt unit RF output. The procedure is identical for all transmitting modes and must be repeated each time the rt unit is adjusted to transmit at a new frequency. The tuning procedure is as follows:

NOTE

References in the following procedure to the signal frequency setting, pertain to the band and frequency determined and recorded during the search procedure (para 2-8a).

(1) Start the AN/TLQ-15 using the procedure given in paragraph 2-6.

(2) On control unit, set controls as follows:

(a) DUMMY LOAD switch to on (green).

(b) HI RF LOW RF switch to LOW RF.

(3) Set rt unit controls as follows: (a) TRANSMIT MODE switch to CONT.

(b) RF OUTPUT control to 1 (ccw).

(4) Set rfa controls as follows:

(a) BAND SELECT switch to frequency band of the signal frequency.

(b) Set IPA TUNING dial indicator to approximate frequency of signal frequency using IPA tuning control.

(c) Set PA PLATE TUNE dial indicator to approximate frequency of signal frequency using FPA plate tune control.

(d) Set PA LOAD TUNE dial indicator to approximate frequency of the signal frequency using FPA load tune control.

(5) Set BAND SELECT PUSH TO TURN switch on soft mounted coupler to the frequency band of the signal frequency.

(6) Set HIGH VOLTAGE switch on control unit to on (yellow). The following INTERLOCKS indicators light (green):

(a) IPA PLATE.

(b) IPA SCREEN.

(c) FPA PLATE.

(d) FPA SCREEN.

(7) Set rt unit controls as follows: (a) METER SELECTOR switch to RF OUTPUT.

(b) Adjust RF OUTPUT control until an indication is noted on the rfa IPA TUNE meter (approximately 0.2 ma).

(8) Perform the following rfa adjustments:

(a) Ipa tuning control for maximum indication on IPA TUNE meter.

(b) Fpa plate tune control for a dip (minimum indication) on PA TUNE meter.

(c) Fpa load tune control for maximum indication on control unit FORWARD POWER meter.

(d) Repeat steps (a), (b), and (c) above, until maximum output (approximately 800 watts) indication is obtained on control unit FORWARD POWER meter. It may be necessary to increase or decrease the setting of the rt unit

RF OUTPUT control to obtain 800 watt output level.

(9) Set HI RF-LOW RF switch on control unit to HI RF.

CAUTION

While performing the following step, do not permit the output power, as indicated by the control unit FORWARD POWER meter, to exceed 2000 watts. If necessary, reduce the setting of the RF OUTPUT control on the rt unit to stay within this limit.

(10) Perform the following rfa adjustments:

(a) Adjust ipa tuning control for maximum indication on IPA TUNE meter.

(b) Adjust fpa plate tune control for a dip (minimum indication) on PA TUNE meter.

(c) Adjust fpa load tune control for maximum indication on control unit FORWARD POWER meter.

(11) On the rt unit, adjust RF OUTPUT control, if required, until control unit FORWARD POWER meter indicates 2000 watts.

(12) Set rt unit RF OUTPUT control fully counterclockwise.

(13) On the control unit, set controls as follows:

(a) Set HIGH VOLTAGE switch to off (white).

(b) Set ANTENNA COUPLER switch to on (green).

(14) Set rt unit RF OUTPUT control three quarter turns clockwise.

(15) Momentarily depress and hold the PUSH TO TUNE switch on the soft mounted coupler and carefully adjust the TUNE control until the soft mounted coupler rf power meter indicates a null (minimum reflected power). Release the PUSH TO TUNE switch.

(16) Set rt unit RF OUTPUT control fully ccw.

(17) Set control unit HIGH VOLTAGE switch to on (yellow).

(18) Set rt unit RF OUTPUT control for approximately 500 watts as indicated on control unit FORWARD POWER meter or an indication on the REFLECTED POWER meter.

(19) On the soft mounted coupler, carefully adjust the TUNE control until the control unit REFLECTED POWER meter indicates a null (minimum reflected power).

(20) Adjust the rt unit RF OUTPUT control, if required, until the control unit FORWARD POWER meter indicates 2000 watts.

NOTE

During the first 5 minutes of operation, periodically check the reflected power. If an increase is detected, readjust the soft mounted coupler by performing (21). If no adjustment is required, proceed to (22) below.

(21) On the soft mounted coupler, carefully adjust the TUNE control until the control unit REFLECTED POWER meter indicates a null (minimum reflected power).

(22) Select desired modulation/keying procedure from those provided in paragraph 2-9.

2-9. Modulation and Keying Procedures

This paragraph contains instructions for setting-up the various modulation and/or keying environments. An overview of the available modulation and keying capabilities is shown in table 2-21. This table also provides the modulation source and rt unit control settings that are required for a specific mode. Before selecting the desired modulation/keying method from table 2-21, perform the following procedure: a. Perform transmitter tuning procedure (para 2-8b) in dummy load mode.

b. Set rt unit TRANSMIT MODE switch to CONT.

c. Set-up modulation and keying in system dummy load mode (see table 2-21); after set-up, desired transmitting procedure given in paragraph 2-10.

2-10. Transmitting Mode Procedures

This paragraph contains instructions for establishing the various transmitting modes. The transmitting modes available are look through, sij and continuous.

a. Look Through. The look through mode permits the operator of the AN/TLQ-15 to maintain a check on a signal of interest during transmitting operation. In this mode of operation, the transmitter and receiver sections of the AN/TLQ-15 are alternately in operation at a cyclic rate determined by the look through circuitry of the pan indicator. When a signal of interest has been detected during the search procedure (para 2-8a), set the AN/TLQ-15 for look through as follows:

NOTE

Omit (1), (2), and (3) below if the transmitter tuning procedure has been performed, and the modulation and keying mode were selected prior to switching to the look-through mode.

(1) Tune the transmitter to the desired signal frequency and adjust the power output, using the procedure given in paragraph 2-8b.

(2) Determine the modulation characteristics of the received signal, using the audible and visual indications.

(3) Select the modulation and/or keying mode desired as outlined in paragraph 2-9 and table 2-21.

(4) Set rt unit TRANSMIT MODE switch to LOOK THRU.

(5) Set rt unit AFC switch to OFF. When using automatic frequency control, set AFC switch to WIDE for normal operation. Set AFC switch to NARROW if desired signal frequency is located in an area of high signal density.

(6) Observe pan indicator crt. The transmitter signal appears below the centerline on the screen during the transmit interval. The received signal appears at the same location above the centerline during the receive interval of the look-through cycle. Adjust pan indicator controls as required for optimum display.

(7) Observe rt unit AFC TRACK indicator. The indicator lights during the receive interval of the look-through cycle to indicate that the afc circuits are being used.

(8) Observe rt unit TUNE HIGHER and TUNE LOWER indicators. The indicators will be out as long as the frequency of the signal of interest remains within $\pm$1 kHz of the center of the rt unit if passband; the rt unit will automatically tune to keep the signal within this passband. If either the TUNE HIGHER or TUNE LOWER indicator lights (red), it indicates that the signal of interest has moved beyond the tracking capability of the rt unit. If the tracking range is exceeded, set AFC switch to OFF and retune rt unit to the new signal frequency and reset AFC switch to previous position.

(9) Periodically check pan indicator crt. If a radical change in the signal frequency is noted, the transmitter must be retuned to the new frequency. The tuning procedure is given in paragraph 2-8b.

b. Sij. This mode of operation permits the operator to place the AN/TLQ-15 into an automatic search-transmit condition; that is, it provides for automatically switching from a search mode to look-through operation when a signal of interest is detected at the preselected frequency of operation. If the signal of interest terminates or the signal level falls below a preselected threshold, the AN/TLQ-15, will automatically revert to a search mode of operation. All controls and indicators referenced in the following procedure are located on the rt unit, unless otherwise indicated.

NOTE

Omit steps (1) and (2) below if transmitter tuning procedure has been performed, and the modulation and keying modes were selected prior to switching to sij mode.

(1) Tune the transmitter to the desired signal frequency and adjust the power output using the procedure given in paragraph 2-1.

(2) Select the modulation and/or keying mode required for sij operation as outlined in paragraph 2-9 and table 2-21.

(3) Set TRANSMIT MODE switch to SIJ.

(4) Set SIJ THRESHOLD control to PRESET or adjust the control for the desired input signal threshold (from 5 to 100 μv).

(5) Set AFC switch to OFF.

(6) When the signal of interest is detected and has a signal level greater than the preselected threshold level, the AN/TLQ-15 will automatically switch to the look-through mode.

(7) Set AFC switch to WIDE for normal operation. Set AFC switch to NARROW if desired signal frequency is located in an area of high signal density.

(8) Observe pan indicator crt. The transmitter signal appears below the centerline on the screen during the transmit interval. The received signal appears at the same location above the centerline during the receive interval of the look-through cycle. Adjust pan indicator controls as required for optimum display.

(9) Observe rt unit AFC TRACK indicator. The indicator lights during the receive interval of the look-through cycle to indicate that the afc circuits are being used.

(10) Observe rt unit TUNE HIGHER and TUNE LOWER indicators. The indicators will be out as long as the frequency of the signal of interest remains with $\pm$1 kHz of the center of the rt unit if, passband; the rt unit will automatically tune to keep the signal within this passband. If either the TUNE HIGHER or TUNE LOWER indicator lights (red), it indicates that the signal of interest has moved beyond the tracking capability of the rt unit. If the tracking range is exceeded, set AFC switch to OFF and return rt unit to the new signal and reset AFC switch to previous position.

(11) Periodically check pan indicator crt. If a radical change in the signal frequency is noted, transmitter must be retuned to the new

frequency. The tuning procedure is given in paragraph 2-8b.

(12) When the received signal level falls below the threshold limit, the AN/TLQ-15 will automatically revert to the search mode.

c. Continuous Transmit. This mode of operation permits the operator to place the transmitter of the AN/TLQ-15 into continuous uninterrupted operation. This mode, which is used during tuning of the transmitter (para 2-8b), can also be used for continuous transmitting or any frequency within range of the AN/TLQ-15. Set the AN/TLQ-15 set for continuous transmit as follows:

NOTE

Omit (1), (2), and (3) below if the transmitter tuning procedure has been performed, and the modulation and keying modes were selected prior to switching to the continuous transmit mode.

(1) Tune the transmitter to the desired signal frequency and adjust the power output, using the procedure given in paragraph 2-8b.

(2) Determine the modulation characteristics of the signal of interest using the audible and visual indications produced by the AN/ TLQ-15.

(3) Select the modulation and keying mode desired as outlined in paragraph 2-9 and table 2-21.

(4) Set rt unit TRANSMIT MODE switch to CONT.

2-11. Remote Operation of Transmitter and Telephone Circuits

Provisions have been made to permit control of high voltage to the transmitter from a remote location and in so doing, key the transmitter. A means has also been provided for connecting a remote telephone set with the telephone in the shelter. The connections for both of these modes of operation are made through the use of the remote telephone junction box connected to the shelter through one 2-wire field telephone cable. Procedures for connecting the remote circuits and operating the equipment are provided below.

a. Transmitter Remote Control. To connect the transmitter for remote operation, proceed as follows:

(1) Connect the 2-wire telephone cable from the remote telephone junction box to the TEL XMTR terminals on the power distribution box (exterior shelter portion); up to a mile of cable may be used for this connection.

(2) Set the TEL XMTR switch on remote telephone junction box to TEL.

NOTE

If the AN/TLQ-15 is in operation, (3) through (8) below can be omitted.

(3) Perform the preliminary starting procedure given in paragraph 2-4.

(4) Perform the preliminary checks and adjustments given in paragraph 2-5.

(5) Perform the starting procedure given in paragraph 2-6.

(6) Tune the transmitter to the desired frequency, using the procedure given in paragraph 2-8b.

(7) Select the desired modulation and keying mode using the procedure given in paragraph 2-9 and table 2-21.

(8) Set rt unit TRANSMIT MODE switch to desired transmit mode.

(9) Set control unit REMOTE XMTR switch to on (green). HIGH VOLTAGE switch and last four INTERLOCKS indicators (IPA PLATE, IPA SCREEN, FPA PLATE and FPA SCREEN) go out (no color).

(10) To remotely key the transmitter, set the TEL XMTR switch on the remote telephone junction box to XMTR. HIGH VOLTAGE switch and last four INTERLOCKS indicators will light and transmitter will be in operation.

(11) To remotely unkey the transmitter, set the TEL XMTR switch on the remote telephone junction box to TEL.

b. Operation of Telephone. The telephone can be used with any manual, two-wire field telephone system using local battery (LB), common battery (CB), or common battery signaling (CBS). The AN/TLQ-15 uses local battery signaling, therefore, the battery switch on the telephone should be set to LB position with a screwdriver. For operation of the telephone in this application, proceed as follows:

NOTE

If during operation the telephone headset is to be used, set the EXT INT switch to EXT and connect telephone headset connector to connector provided on front side of the telephone.

(1) With handset in retaining cradle, rotate handcrank several times to activate buzzer of associated telephone.

(2) Lift telephone handset off the retaining cardle and press the push-to-talk switch to talk; release to listen.

2-12. Operation of Operator's Compartment Temperature Control System

a. General. This system is used for heating or cooling the operators compartment and consists of the thermostatically controlled personnel heater, equipment air damper, personnel fan, and air-conditioner. Instructions for operating the equipment are given below.

b. Heating. Heat is provided for three sources: personnel heater; equipment air damper; and air-conditioner, operating in reverse cycle mode. Instructions for operating the equipment are as follows:

(1) To operate the personnel heater, set HEATER circuit breaker on the power distribution box to on (in), and set PERSONNEL HEATER switch to HIGH or LOW. Set operator's thermostat control to select desired temperature.

(2) To operate the equipment air damper, pull the damper control to the out position. This will permit heat from the equipment compartment to circulate into the operator's compartment.

(3) To operate the air conditioner in reverse cycle mode, set the air conditioner mode switch to HI-HEAT or LO-HEAT, and adjust DECREASE-INCREASE control to regulate air temperature. Set HI SPEED-LO SPEED switch to the desired position.

c. Cooling. Cooling is provided by the air conditioner. To operate the air conditioner, set the air conditioner mode switch to COOL; and adjust the DECREASE INCREASE control to regulate air temperature. Set HI SPEED-LOW SPEED switch to the desired position.

d. Air Exhaust. To start the personnel fan, release the pull chain from the retaining bracket.

2-13. Communications Operation

a. Vhf Radio Link. The comm radio set and the equipment housed in the t-sec enclosure provide additional communication facilities for the AN/TLQ-15. The comm rt unit is the main communications equipment. The comm rcvr permits the operator to' monitor a channel other than the one he is transmitting on via the comm rt unit. This equipment can be used for communication purposes in either fixed-station or mobile applications.

(1) To operate the equipment perform the preliminary starting procedures given in paragraph 2-4 through p. Connect comm handset to J6 on side of t-sec enclosure. Use the handset to transmit and receive; a speaker inside the t-sec enclosure may also be used for reception.

NOTE

If the 24 volt cranking battery for the generator is being used and its charge falls below a predetermined level, the low voltage detector automatically disconnects the battery from the comm radio set to conserve the battery for generator starting.

(2) To install the equipment mobile, refer to paragraph 2-18 of this chapter.

b. Hf Radio Link. The AN/TLQ-15 equipment normally used for countermeasures can also be operated at two kw to provide a two-way hf radio link. The transmitter may be voice modulated in any of the modes available although the fm mode is not available in the receive function. Normally, the hf radio link would be operated in the am. or double sideband modulation mode. To operate the equipment, perform the tuning procedures for the cont. mode of operation as given in paragraph 2-8b. With the transmitter tuned, perform following steps:

(1) At modulation source, set VOICE switch to on (green).

(2) At rt unit, set TRANSMIT MODE switch to VOICE R/T.

(3) At rt unit, set MODULATION switch to modulation mode required which is normally AM or DSBSC.

(4) Normally the RECEIVE MODE switch at the rt unit would be set to the corresponding modulation mode.

(5) To transmit, depress push-to-talk switch on cm mic. To receive, release push-to-talk switch.

NOTE

When the transmitter on vhf link is activated, modulation is interrupted on the hf link to maintain communications security.

2-14. Stopping Procedures

a. Standby Shutdown. The standby shutdown procedure for the AN/TLQ-15 consists of setting the controls on the control unit as follows:

(1) Insure that REMOTE XMTR switch is set to off (white).

(2) Set HIGH VOLTAGE switch to off (white).

b. Normal Shutdown. The normal shutdown procedure for the AN/TLQ-15 is given below.

(1) On the control unit set the controls as follows:

(a) REMOTE XMTR switch to off (white).

(b) HIGH VOLTAGE switch to off(white).

(c) HI RF-LOW RF switch to LOW RF.

(d) DUMMY LOAD switch to on (green).

(e) STANDBY switch to off (white).

(2) On the rt unit, set TRANSMIT MODE switch to OFF and POWER ON circuit breaker to off (down).

(3) On the pan indicator, set POWER INPUT switch to OFF.

(4) On modulation source, set PWR switch to OFF.

(5) On the digital counter, set POWER switch to OFF.

(6) Set the following circuit breakers on the power distribution box to off (out):

(a) PREHEATER.

(b) HEATER.

(c) UTILITY.

(7) Set air conditioner mode switch to OFF.

(8) Set the following circuit breakers on the power distribution box to off (out):

(a) AIR COND.

CAUTION

Do not set 3 0 BLOWERS circuit breaker to off until equipment blowers automatically stop (approximately 3 minutes after STANDBY switch is set to off). Failure to comply could result in equipment damage.

(b) 3 ϕ BLOWERS.

(c) DC CONV.

(d) Lights ON-OFF to OFF; open main shelter door.

(e) MAIN.

(f) GENERATOR CONTROL switch to STOP; listen for generator to stop running.

(9) Set comm rt unit POWER switch to OFF.

(10) Set comm rcvr POWER switch to OFF.

c. Emergency Shutdown. The emergency shutdown procedure for the AN/TLQ-15 consists of stopping the generator by setting the GENERATOR CONTROL switch on the power distribution box to STOP.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-15. Extreme Climatic Conditions

a. General. The AN/TLQ-15 is designed for operation over a wide range of normal climatic conditions. The shelter and trailer provide complete protection from the elements for personnel and equipment; however, under extreme climatic conditions, the following additional precautions are necessary.

b. Extreme Cold. Extreme cold causes cables and wires to become hard, brittle, and difficult to handle. Be careful when handling and connecting cables to avoid kinks and unnecessary loops that might result in permanent damage. Make sure that binding posts and connectors in the shelter entrance box and on the trailer are free of frost, snow, and ice. Replace the covers on receptacles when not in use.

c. Extreme Heat. In hot dry climates, connectors, receptacles, and binding posts are subject to damage from dust and dirt. Replace the covers on connectors and receptacles when not in use.

d. Humidity. When operating in areas of high humidity, the equipment is subject to damage from moisture and condensation. Wipe all surface moisture from the equipment, using a clean, lint-free cloth. Operate the shelter environmental control systems (heater and/or air-conditioner) to maintain operating environment at a safe humidity level.

2-16. Emergency Operation

CAUTION

Continued use of the battle short circuit in the presence of serious overload conditions will result in damage to the AN/TLQ-15.

The AN/TLQ-15 is equipped with a battle short circuit that may be used to keep the equipment operational in the presence of overload conditions. The battle short circuit is intended for use only in cases of extreme tactical emergency. It permits the interlocks and overload protection circuits of the ANTLQ-15 to be bypassed to apply power to the equipment, even though application of power may cause damage to the equipment. The battle short circuit is actuated at the control unit by lifting the red cover and setting the BATTLE SHORT switch to on (up). (BATTLE SHORT indicator will light)

Section IV. PREPARATION FOR MOVEMENT

NOTE

Preparation for movement and installation procedure must be made with the assistance of organizational maintenance personnel.

2.17. General

This section provides directions for site selection, unpacking, and installation for both mobile and fixed operation of the AN/TLQ-15. Directions are provided for fixed operation when the shelter remains on a vehicle or is positioned on the ground. Directions are also provided for dismantling the installation for movement.

2-18. VHF Mobile Communications Installation-M715 Vehicle

a. On shelter t-sec enclosure, remove comm control unit, secure comm speaker amplifier, and cables CX-12925/TLQ-15 and 1A18W11 (fig. 1-5). Remove truck adapter kit from storage location in shelter (fig. 1-3); remove cables 4A1W1 and 4A1W2 from storage location.

b. Disconnect comm handset (H-189/U) if one is installed on either the control unit or the rt unit.

c. Mount and secure control unit, secure comm speaker amplifier, and cables CX-12925/TLQ-15, 4A1W1, 4A1W2, and 1A18W11 to the truck adapter kit (fig. 1-8).

d. Connect truck adapter kit power cable to secure comm speaker amplifier POWER connector.

e. Place truck adapter kit on passenger seat in truck cab.

f. Remove battery box cover and locate relief tube located in the bottom rear roadside corner of batter box.

g. Drop one end of a 3-foot fish line or string down through battery box relief tube.

h. Inside cab, loosen canvas straps and route truck adapter kit battery power cable 4A1W3 between canvas and cab rear wall; continue routing of power cable down between cab and body as far as it will go (fig. 2-20.1).

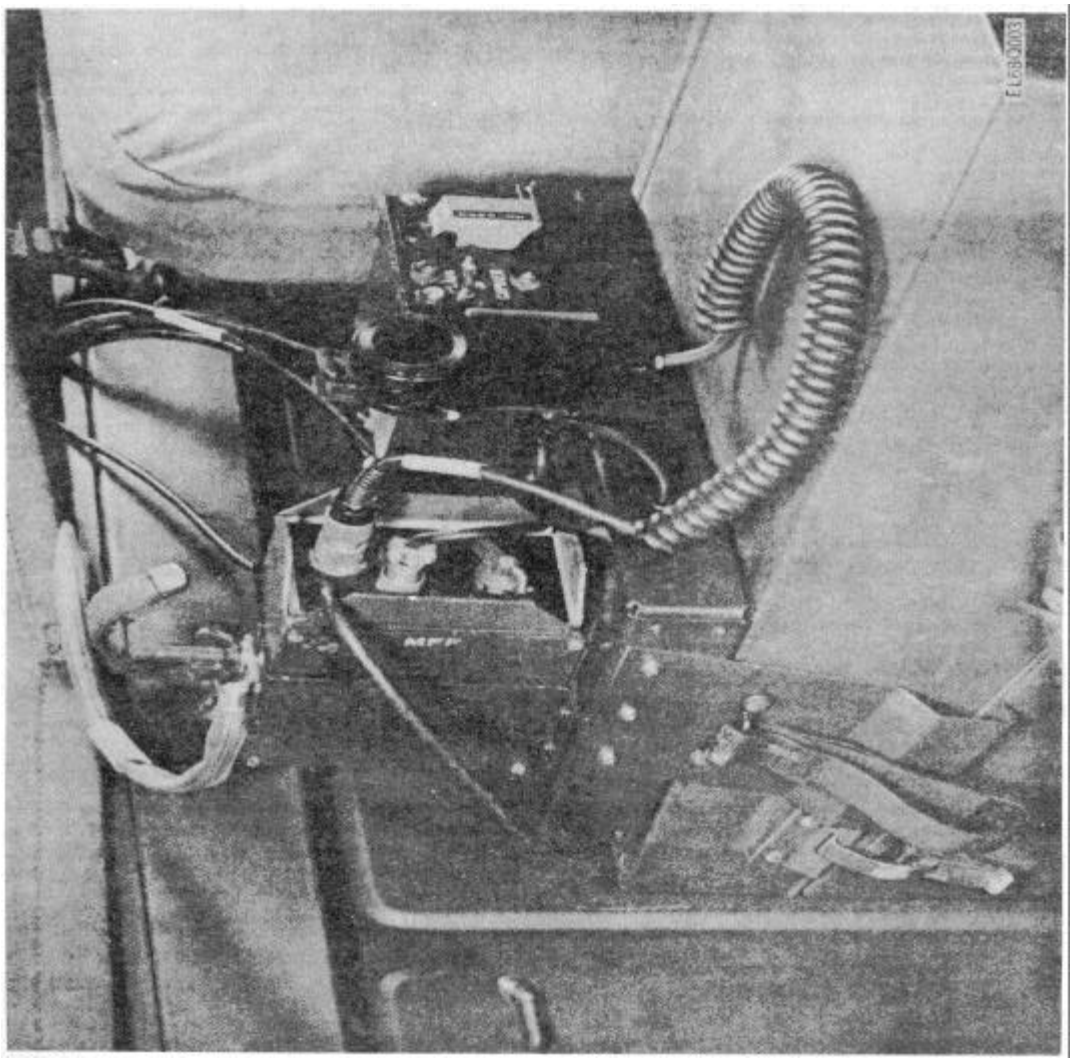


Figure 2-20.1. Truck adapter kit installed, M715 vehicle.

i. Under vehicle, attach fish line securely to power cable pig tai leads

j. Inside truck cab, pull fish line to bring power cable through relief tube and into battery box.

k. Remove fish line from power cable pig tail leads.

l. Attach (+) lead to battery connector marked P and (-) lead to battery connector marked N.

m. Mount truck adapter bracket legs on battery box cover; replace cover on battery box and close battery box fasteners (fig. 2-20.1).

n. Connect ground cable 4A1W1 from secure comm speaker amplifier to shelter 1A12 ground by attaching cable end to shelter radial connections on front and side of shelter; use ground strap to make side connections (fig. 2-20.2). Secure ground connections with thumbscrews.

o. Lift canvas far enough to permit connection of cable 1A18W11 from comm control unit J1 to 1A12A3J4 on shelter (fig. 2-20.2).

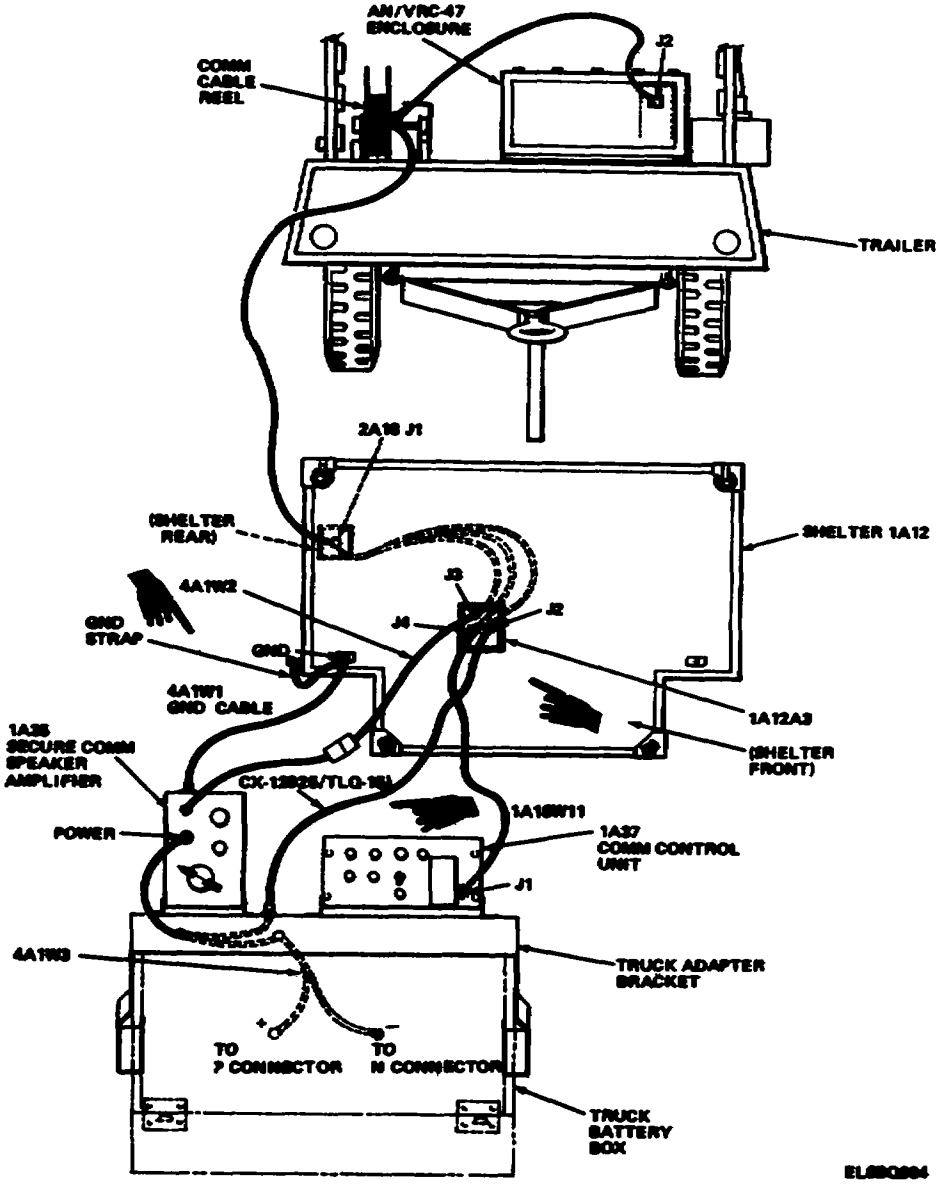


Figure 2-20.2. Vhf mobile communications interconnection, M715 vehicle.

p. Connect cable from secure comm speaker amplifier to cable 4A1W2; connect 4A1W2 to 1A12A3J3 on shelter (fig. 2-20.2).

q. Connect cable CX-12925/TLQ-15 from truck adapter bracket power connector to 1A12A3J3 on shelter.

r. Refasten truck cab canvas.

s. Connect comm handset to AUDIO connector on secure comm speaker amplifier.

t. Install comm rt antenna base located at from roadside of trailer and tighten assembly (fig. 1-7).

u. At trailer, pull locking pin from comm cable reel and unreel sufficient length of comm cable to mate connector

to connector J1 on outside of t-sec enclosure.

CAUTION

Allow sufficient length of comm cable to provide slack between the shelter and trailer for turning of vehicle.

v. Connect snap hook, attached to the strain hanger at end of comm table, to shelter lifting ring above connector J1.

w. Reinstall locking pin at comm cable reel.

x. Mate comm cable connector at comm cable reel to connector to reel.

y. Set truck adapter kit circuit breaker to on.

z. Set secure comm speaker amplifier POWER switch to ON.

aa. Set comm control unit POWER switch to ON and PLAIN CIPHER switch to desired mode of communications.

bb. Vhf mobile communication installation is now ready for operation.

2-18.1 Vhf Mobile Communications Installation-M883 and M884 Vehicles

a. On shelter t-sec enclosure, remove comm control unit, secure comm speaker amplifier (fig. 1-5). And cables CX-12925/TLQ-15 AND 1A18W11.

b. Remove truck adapter kit from storage location in shelter (fig. 1-3). Remove comm handset and cables 4A1W1 and 4A1W2 from storage locations.

c. Install comm control unit and secure comm speaker amplifier on truck adapter kit mounting base (fig. 1-8).

d. Inside cab, position mounting base on transmission tunnel and secure assemble in place using mounting straps attached to mounting base (fig. 2-20.3).

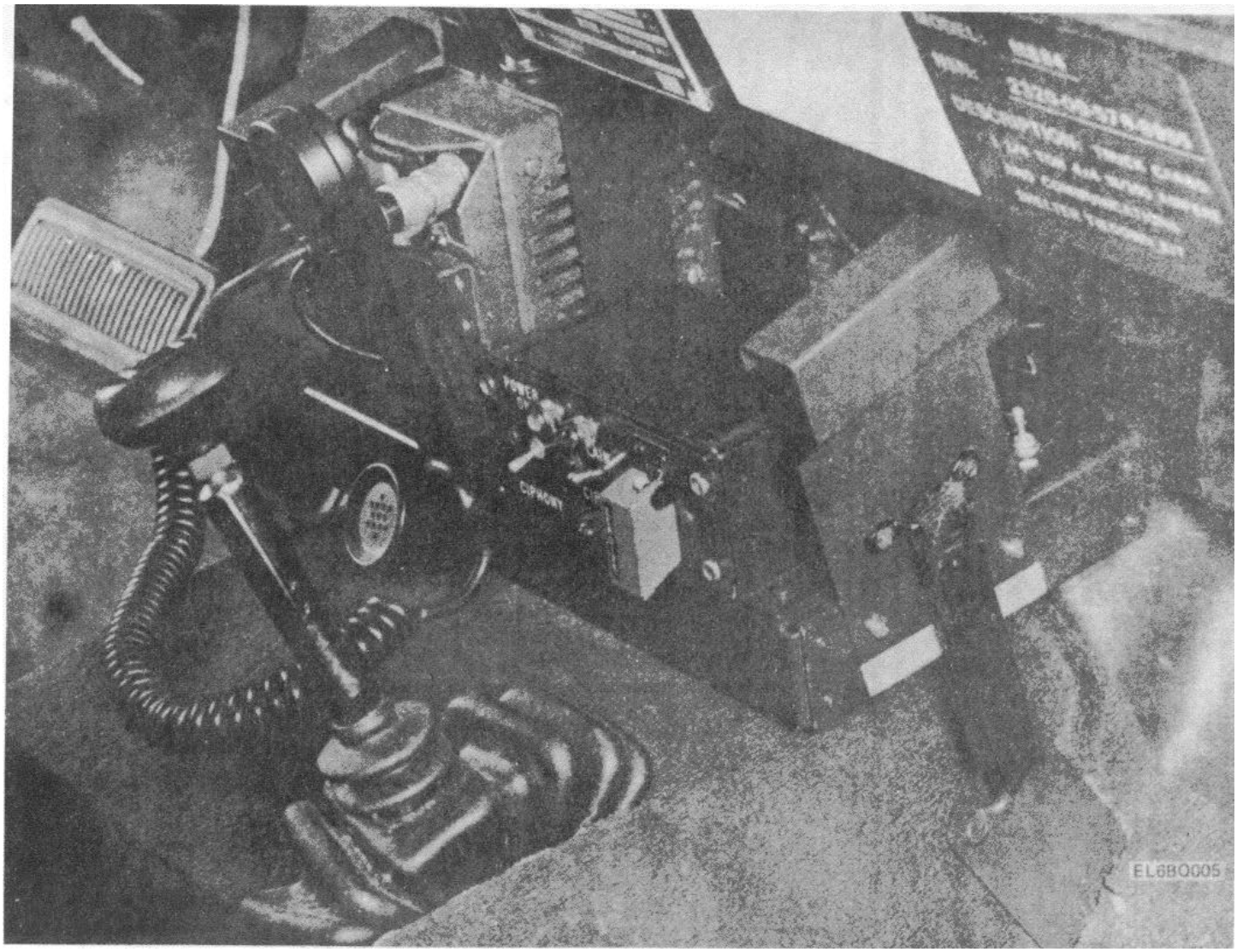


Figure 2-20.3. Truck adapter kit installed-M883 and M884 vehicles.

e. Connect truck adapter kit power cable to secure comm speaker amplifier POWER connector (fig. 1-8).

f. Connect ground cable 4A1W1 to secure comm speaker amplifier (fig 1-8).

g. Connect cable CX-12925/TL(5 to truck adapter kit mounting base (fig. 1-8).

h. Connect cable 1A18W11 to comm control unit (fig. 1-8).

i. On curbside of vehicle, remove four sheet metal screws securing aluminum door sill trim plate to door sill and remove trim plate.

j. Raise floor mat on passenger side of vehicle and dress cables along edge of transmission, tunnel, and pass cables through hole in truck floor to underside of vehicle.

k. Connect secure comm speaker amplifier cable to cable 4A1W2 under floor mat (fig. 1-8 and fig 2-20.4), and pass through hole in floor.

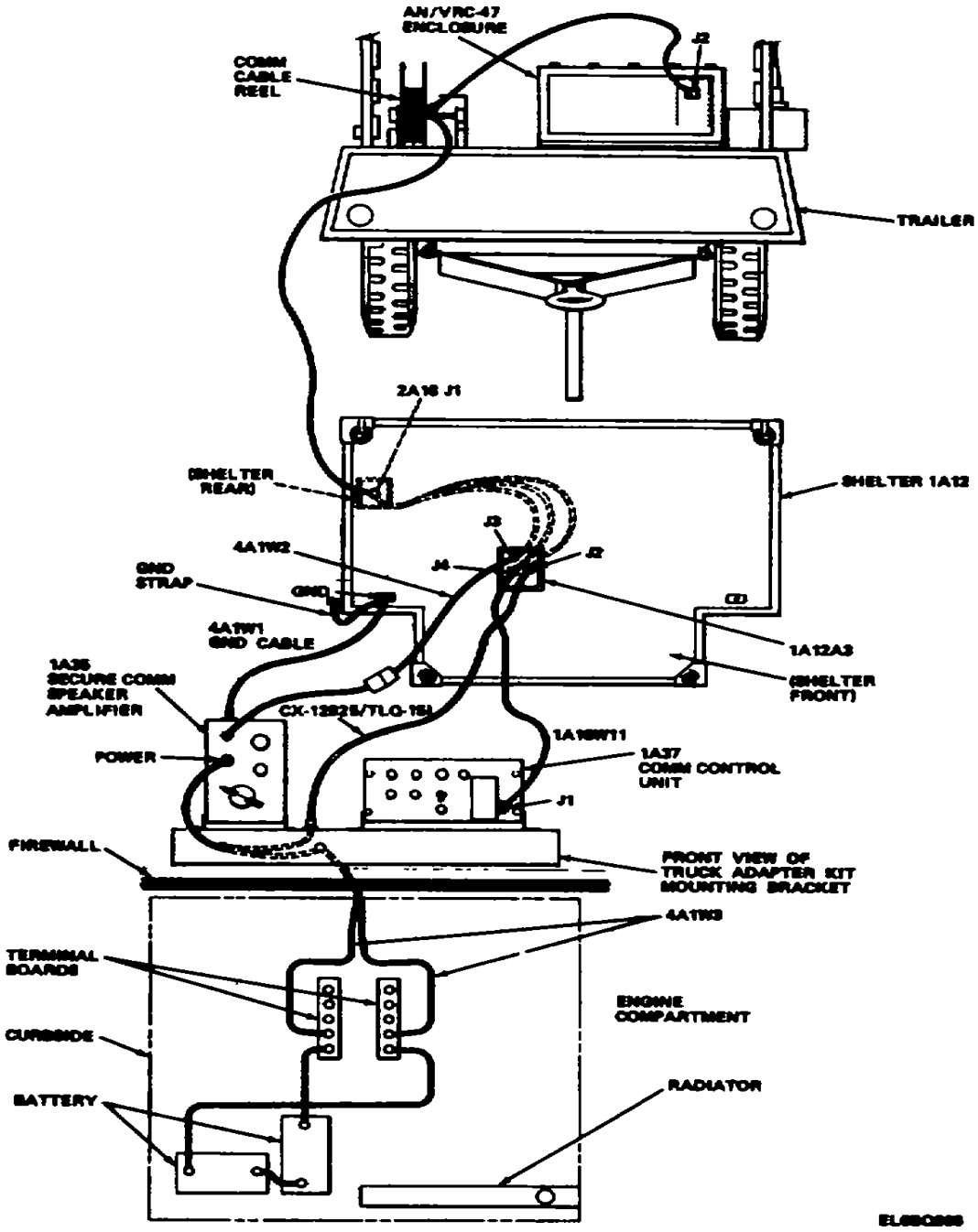


Figure 2-20.4 Vhf mobile communication interconnection M883 and M884 vehicles

l. Dress and secure battery power cable 4A1W3 to existing cable group on cab floor and pass terminal ends of cable down through hole in cab floor to underside of vehicle.

m. Under vehicle, route battery power cable 4A1W3 forward along existing channel and under fire wall into engine compartment; secure cable to underside of vehicle.

n. Check that circuit breaker CB1 on truck adapter kit mounting base is set to OFF position.

o. Raise engine hood, and disconnect positive battery cable from truck battery located on curbside (fig. 2-20.4).

p. Connect terminal leads of cable 4A1W3 to terminal boards on fender well in engine compartment (fig. 2-20.4). Observe polarity marked on cable leads while making this connection. Reconnect positive battery cable to battery.

q. Run remaining cables to back of cab and connect cables CX-12925/TLQ-15, 4A1W2, and 1A18W11 to connectors J2, J3, and J4, respectively in shelter junction box 1A12A3 (fig. 2-20.4). Secure cables to underside of vehicle.

r. Connect ground cable 4A1W1 from secure comm speaker amplifier to shelter radial connection on front and side of shelter; use ground strap to make side connection (fig. 2-20.4). Secure ground connections with thumbscrews.

s. Replace floor mat on laser side of vehicle and reinstall aluminum door sill trim plate.

t. Connect comm handset to AUDIO connector on secure comm speaker amplifier.

u. Install comm rt antenna located at front roadside of trailer and tighten assembly (fig. 1-7).

v. At trailer, pull locking pin from comm cable reel and unreel sufficient length of comm cable to mate connector to connector J1 on outside of t-sec enclosure.

CAUTION

Allow sufficient length of comm cable to provide slack between the shelter and trailer for turning of vehicle.

w. Connect snap hook, attached to the strain her at end of comm cable, to shelter lifting ring above connector J1.

x. Reinstall locking pin at comm cable reel.

y. Mate comm cable connector at comm cable reel to connector on reel.

z. Set truck adapter kit circuit breaker to on.

aa. Set secure comm speaker amplifier POWER switch to ON.

bb. Set comm control unit POWER switch to ON and PLAIN-CIPHER switch to desired mode of communications.

cc Vhf mobile communications installation is now ready for operation.

2-19. Fixed Communications and Countermeasures

a. Site Selection Site selection is determined by the tactical situation and local topographical features. Signal attenuation and radiation pattern distortion must be considered when choosing the site. An ideal condition would e consist of an area that is high, flat, no obstructions to the point of interest, rf inference-free, tactically secure, and easily accessible. Refer to figure 2-21 for space requirements.

b. Equipment Placement.

(1) Drive truck with trailer to where the trailer will be located.

(2) Lower and lock leg prop in position, disconnect trailer from truck, and set both hand brakes to lock trailer wheels.

(3) Drive truck with shelter to desired location. See figure 2-21 for typical installation.

c. Shelter Removal from Truck. If shelter is to remain on the truck, follow procedures beginning with below. If shelter is to be removed from tuck, proceed as follows:

(1) Loosen turnbuckles on each of the four tiedown cables.

(2) Install the four sling assembly cables to the lifting hook of a lifting device and hook other end of each ding assembly cables to Miffing eye at each comer of shelter. See (fig 2-22).

(3) Attach one end of each of four guide ropes to a towing eye at each lower corner of shelter.

(4) Using a lifting device having a 3000 pound lifting capability, from truck, the shelter with the four guide ropes (5) Move truck to clear the Per and lows ate r to ground. Check shelter for levelness and stability. Detach all lifts and guide devices.

d Antenna Installation.

(1) Loosen six captive thumbscrew and remove cover plate from insulator base open located on top of shelter.

(2) At trailer, loosen six captive thumbscrews and remove antenna insulator. Store cover late removed in previous step in place of the removed antenna insulator. See figure 2-23.

(3) Remove al dirt and foreign matter from antenna coupling socket inside insulator.

(4) Place antenna over opening on shelter roof, Fasten securely with the six captive thumbscrews.

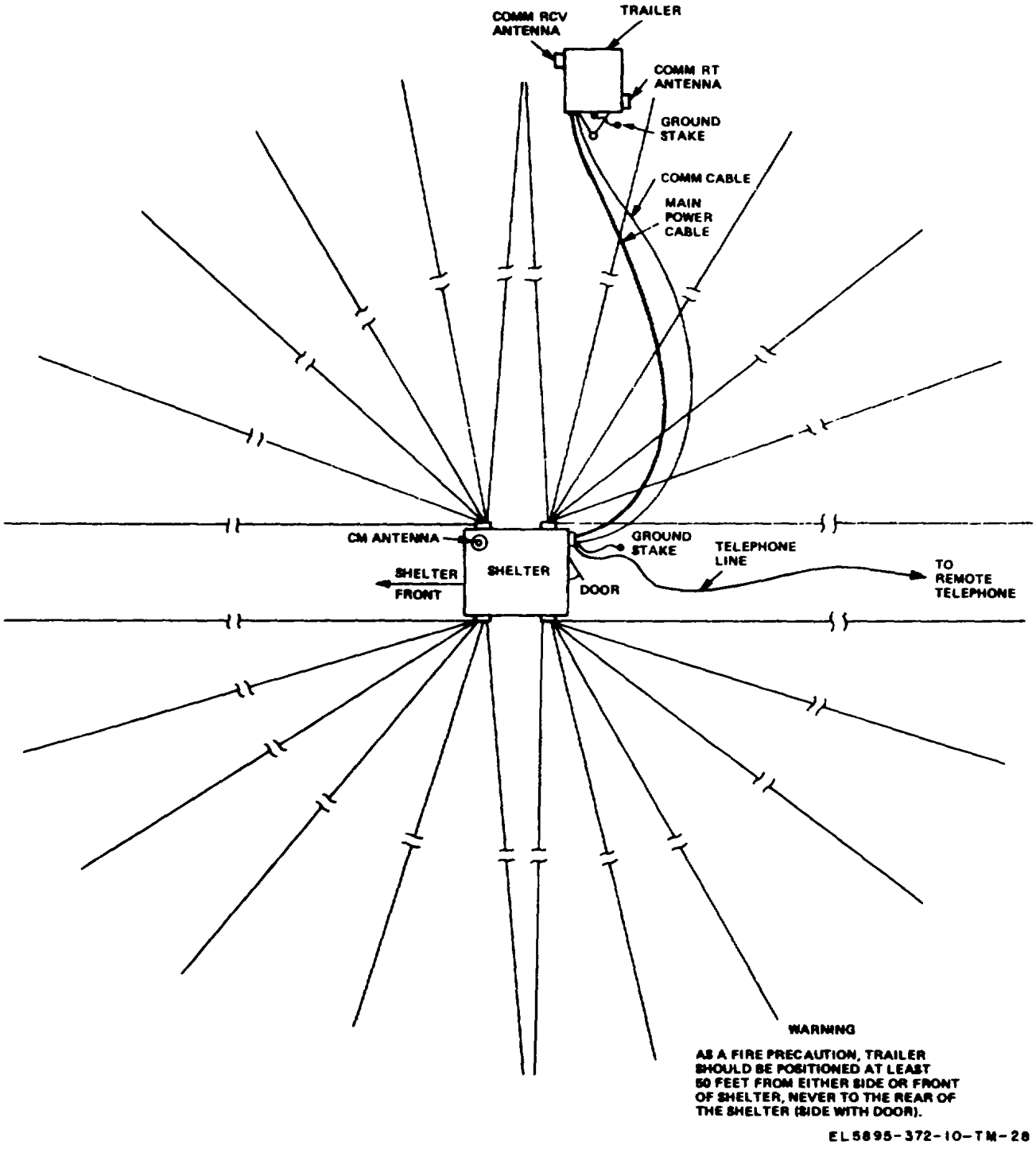


Figure 2-21. Installation layout.

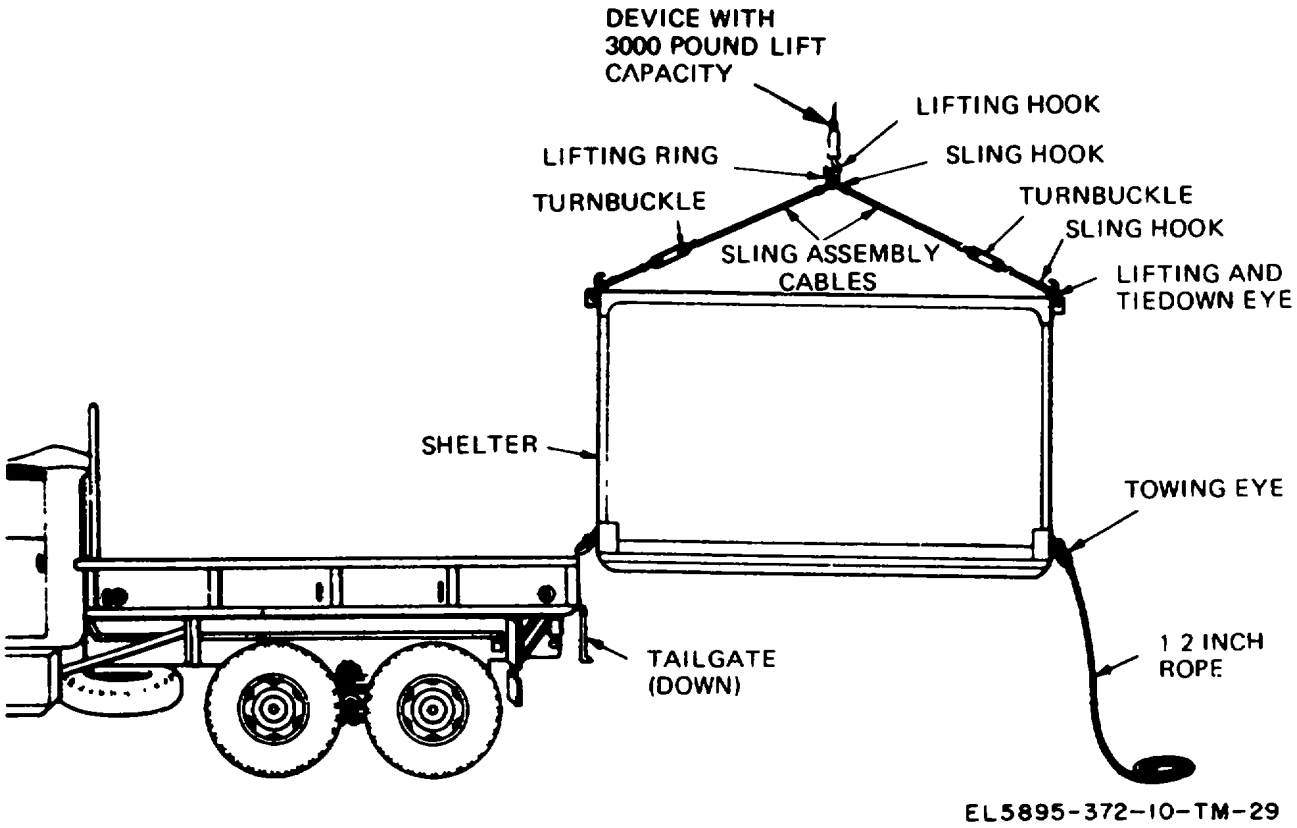


Figure 2-22. Rigging for loading and unloading of shelter

(5) At trailer, unfasten holddown strap, unlatch retainer clamps and remove telescopic whip antenna from supporting bracket.

(6) On top of shelter, insert large end of whip antenna into insulator socket until two latches lock antenna in place.

(7) Detach bungee cord retainer at far end of whip antenna and store retainer in spare parts case.

(8) Starting with smallest element (the one with corona ball pull whip antenna element out to its fully extended position, ensuring that the springloaded pin engages the detent in whip antenna t.

(9) Repeat procedure with remaining whip ant-e elements.

CAUTION

Be sure that all spring-loaded locking pins are engaged in the detent position to event antenna collapse. Antenna of incorrect length will not provide required load conditions for the transmitter.

(10) At trailer, remove comm rt antenna and comm rcv antenna from their respective storage locations and assemble antenna sections. See figure 2-23 for storage locations.

(11) Install antennas at front and rear of trailer, fastening securely. See figure 2-3 for antenna locations.

(12) If shelter is truck mounted, remove ladder stored on top of generator and hook ladder to tailgate.

(13) Hook two retainer cables on ladder to two towing eyes and adjust cable tension to hold ladder securely to rear of shelter.

e Counterpoise Set Installation Perform the following procedures at rear of trailer:

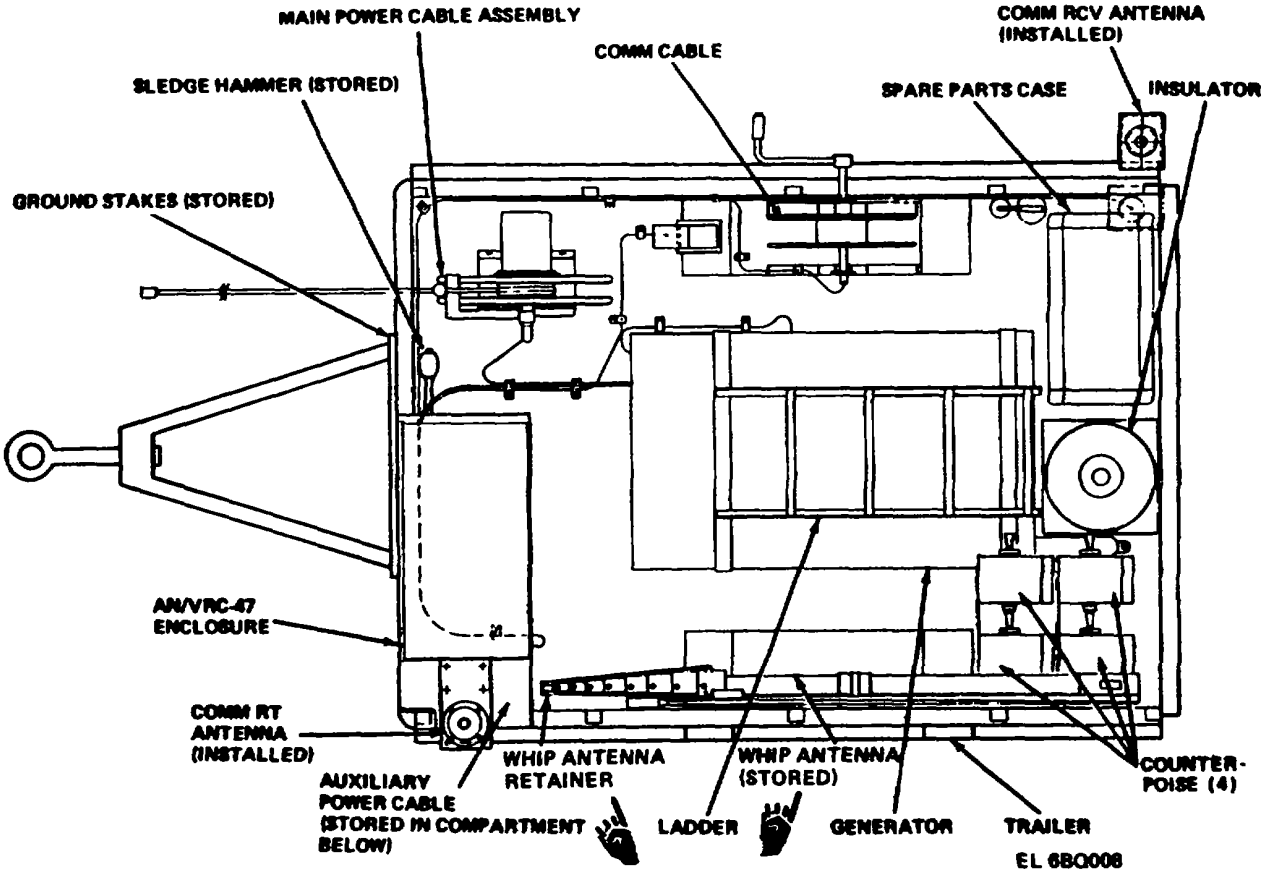


Figure 2-23. Trailer, top view, location of equipment for installation.

(1) Unscrew captive screws holding four counterpoises to storage rack. See figure 2-23 for location.

(2) Lift and disengage each counterpoise from storage rack.

(3) Transfer four counterpoises to shelter area. Engage each counterpoise to mounting rack on each corner of shelter.

(4) Fasten each counterpoise securely using captive screw.

(5) Remove grounding set from spare parts case and fasten each strap from counterpoise to shelter structure at points provided. Tighten screws securely.

(6) Withdraw each counterpoise radial to its full 56 foot length and arrange on ground in a circular pattern as shown in figure 2-21.

NOTE

Radials should not be twisted and should lie flat on the ground to aid in maintaining desired radiation pattern.

(7) At each counterpoise, tighten clamping bar on radials, using two captive thumbscrews provided. The clamping bar installation completes the counterpoise electrical connections.

f Grounding, Stake Installation. At shelter, select a point on the ground within six feet of shelter ground tiepoint and proceed as follows:

(1) Scoop out about six inches of soil where ground stake is to be driven.

(2) Remove a two-piece grounding stake from retainer at front of trailer.

(3) Assemble two piece grounding stake and, using sledge hammer supplied, drive unto ground at bottom of 6 inch hold until top of stake is 3 inches above bottom of hole.

(4) Using grounding strap from spare parts case, secure one end to top of grounding rod and other end to GND terminal on power distribution box outside the shelter.

(5) Fill hole in ground with soil and saturate area around stake with water.

(6) Repeat steps (1) through (5) below at grounding tie point at front of trailer, using grounding tie point provided.

g. Cable installation.

(1) At trailer, unreel main power cable (cable reel closest to front of trailer) while walking toward shelter. Arrange cable to lie straight and flat on ground.

(2) Mate main power cable connector to POWER connector on power distribution box outside the shelter.

CAUTION

Before performing following step, ensure that connector at reel end of cable is disconnected and installed in its storage clip.

(3) At trailer, pull locking pin from com cable reel and unreel comm cable (cable reel mounted on fender well) while walking toward shelter. Arrange cable to lie straight and flat on ground.

(4) Mate comm cable connector to connector J1 on t-sec enclosure outside the shelter and mate connector at reel and to connector on reel.

(5) The power distribution box has two terminals to which a two-conductor telephone line is connected when remote control of the transmitter is required.

2-20. Shelter Installation on Truck

To install shelter on a truck, proceed as follows:

WARNING

To avoid injury to personnel, or damage to equipment, permit only those personnel engaged in the actual loading operation to be near the truck, lifting device, or shelter. To eliminate confusion, all instructions must come from the loading crew supervisor. Injury or DEATH can result from failure to comply with safe practices.

(1) Lower tailgate of truck and empty truck body of all tools and equipment.

CAUTION

When loading shelter be extremely cautious of using pry bars or similar tools as shelter skin is very vulnerable to dents and punctures. When use of these tools is absolutely necessary, pry under the shelter skid rails only.

(2) Connect sling hooks (one nearest turn-buckles, fig 2-23) to lifting eyes provided on roof of shelter.

(3) Connect other sling hooks and hook on overhead lifting device to lifting ring

(4) Tie a ½ -inch guide rope (approximately 15 feet long) to each rear towing eye.

(5) Use overhead lift and position a man on each guide rope to lift shelter high enough to clear truck

(6) Position truck under shelter slowly lower shelter to its correct position on truck. Remove sling, lifting device, and guide ropes; raise and secure truck tailgate.

(7) Install a tiedown ring assembly (part of the sling assembly) above center support of each cargo bed side-rail of truck (B, fig. 2-24).

(8) At each side of shelter, use the hook at the farthest from the turnbuckle to hook each sling assembly cable to a lifting and tiedown eye of the shelter. Secure sling hooks at opposite end of cables to the tiedown ring (A, fig. 2-24).

CAUTION

Do not overtighten turnbuckles. Overtightening turnbuckles will cause distortion and damage to shelter.

(9) Tighten all turnbuckles evenly by hand and then turn each turnbuckle an additional one-half turn with a bar or rod inserted into the slot of the turnbuckle.

(10) Store ladder, used at the shelter, on top of generator in retainers provided.

2-21. Preparation for Movement

NOTE

If mobile VHF radio communication is to be maintained during movement, refer to paragraphs 2-18 and 2-18.1 for installation instructions for mobile operation.

a. Cable Removal.

(1) If remote control telephone line was installed, disconnect field telephone and disconnect telephone line from the two terminals at power distribution box on out-side of shelter.

(2) Wind telephone wire on reel and store wire and field telephone in trailer.

(3) Disconnect comm cable connector from connector J1 on T-sec enclosure on outside of shelter.

(4) At cable reel on trailer, disconnect comm cable connector from cable reel to allow reel to turn.

(5) Wind comm cable on reel using captive crank provided.

(6) Push captive crank into storage position and lock reel using captive pin at the reel connector.

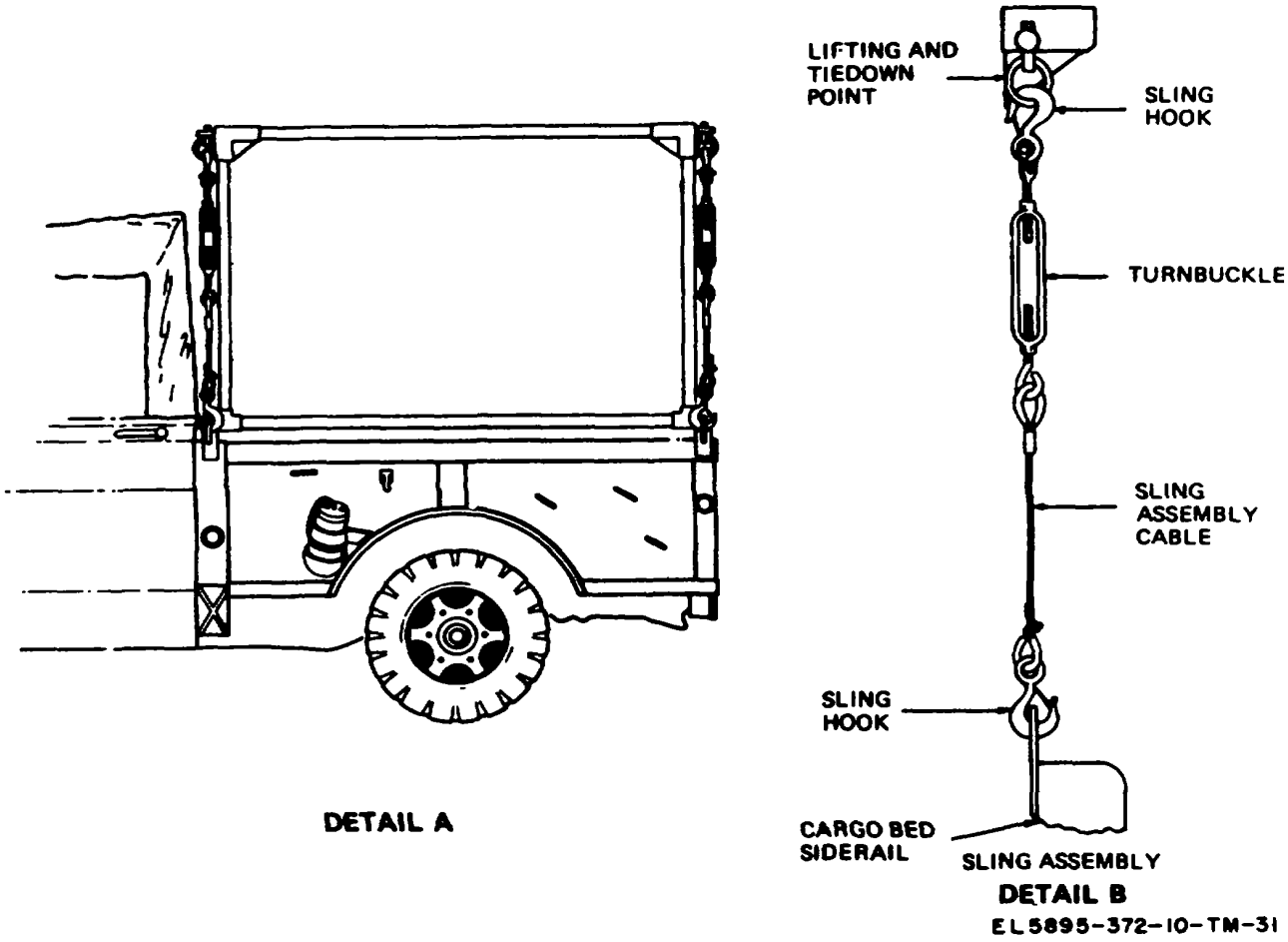


Figure 2-24. Securing shelter to truck.

(7) Snap connector at reel end of comm cable into the clip provided.

(8) Disconnect main power cable connector from power connector J1 on power distribution box on outside of shelter.

(9) At trailer, pull some main power cable from reel to initiate the springloaded reel action.

(10) Allow cable to rewind slowly, guiding main power cable onto reel.

b. Grounding Stake Removal

(1) At both shelter and trailer, disconnect grounding straps connecting the ground stakes to the associated grounding terminal.

(2) Pull grounding stake from soil. Clean stakes and store in trailer in racks provided.

c. Counterpoise Set Removal

(1) At each counterpoise, loosen the turn captive thumbscrews to release clamping bar which secures the radials.

(2) At each counterpoise, carefully wind up all radials using captive crank.

(3) At each counterpoise, tighten two captive thumbscrews holding clamping bar to secure radials on the reels.

(4) Remove grounding strap from each counterpoise and store straps in spare parts case on trailer.

(5) Unscrew captive screw holding each counterpoise to mounting rack.

(6) Disengage each counterpoise from its mounting rack and transfer each counterpoise to the storage racks in the trailer.

(7) Secure each counterpoise to the storage rack using the captive screw.

d Cm Antenna Removal On top of shelter, disassemble the cm antenna as follows:

(1) Starting at the top of the bottom whip Antenna section, disengage spring-loaded pin and slowly allow antenna to telescope into the bottom antenna section.

(2) Repeat this procedure with each next higher antenna section until all antenna sections are telescoped into the bottom antenna section.

(3) Unlock holding latches at bottom of telescoped antenna and withdraw telescoped whip antenna from insulator socket.

(4) Install bungee cord retainer over top end of telescoped whip antenna.

(5) Store ship antenna in trailer, using the support brackets.

(6) At trailer, remove shelter cover plate by loosening six captive thumbscrews holding it to cm antenna insulator storage base.

(7) On top of shelter, loosen six captive thumbscrews on cm antenna insulator, raise cm antenna insulator and set aside.

(8) Install shelter cover plate in place of antenna insulator, tightening the six captive thumbscrews securely.

(9) Install antenna insulator on storage base in trailer, tightening the six captive thumbscrews securely.

(10) Unscrew, disassemble, and store both antennas mounted on the trailer.

NOTE

If mobile communications is to be maintained during the move, allow comm rt antenna to remain installed

e Shelter and Trailer.

(1) Secure folding chair inside shelter with straps provided.

(2) Disconnect microphones, headsets, handsets, and telegraph keys and store in drawer provided.

(3) If boarding ladder was used, detach cables holding ladder to shelter. Store on top of trailer fastening with straps provided.

(4) Close exhaust fan door, both sliding doors used for equipment cooling and entrance door to the shelter. Lock all doors securely.

NOTE

If shelter was installed on the ground, refer to paragraph 2-20 for instruction for truck mounting the shelter.

(5) Back truck up to trailer and attach pintle to truck towing ketch and attach safety chains.

(6) Raise and lock trailer leg prop into towing position

(7) Close and lock trailer gates and adjust tarpaulin for road travel.

(8) Release both hand brakes to unlock trailer wheels.

f. VHF Mobile Communications-M715 Vehicle

(1) Disconnect comm cable connector from connector J1 on T-sec enclosure on outside of shelter (fig. 2-20.2).

(2) Release snap hook holding strain hanger to shelter lifting ring.

(3) At trailer, disconnect comm cable connector from comm reel connector and snap connector into clip provided.

(4) Withdraw locking pin from comm cable reel to allow reel to turn.

(5) Wind comm cable on reel using captive crank provided.

(6) Push captive crank into storage position and lock reel using captive pin at the reel connector.

(7) In truck cab, disconnect comm handset from connector J1 on secure comm speaker amplifier.

(8) Disconnect cable CX-12925/TLQ-15 from truck adapter kit and connector 1A12A3J2 (fig. 2-20.2).

(9) Disconnect cable 4A1W2 from 1A12A3J3 (fig. 2-20.2).

(10) Disconnect cable 1A18W11 from comm control unit and connector 1A12A3J4 (fig. 2-20.2).

(11) Disconnect ground cable 4A1W1 from secure comm speaker amplifier and from shelter 1A12 radial connections (fig. 2-20.2).

(12) Remove battery box cover and disconnect truck adapter kit battery power cable 4A1W3 from battery connectors (fig. 2-20.2).

(13) Push power cable 4A1W3 down through battery box relief tube until cable is free of truck battery box.

(14) Loosen straps that secure canvas top to cab and carefully pull cable 4A1W3 up between cab and shelter until entire cable is inside cab; tighten straps that secure canvas top.

(15) Remove truck adapter kit, attached components, and cables from cab and store in designated locations within shelter.

g. VHF Mobile Communications-M883 and M884 Vehicles.

(1) Disconnect comm cable connector from connector J1 on T-sec enclosure on outside of shelter (fig. 2-20.4).

(2) Release snap hook holding strain hanger to shelter lifting ring.

(3) At trailer, disconnect comm cable connector from comm reel connector and snap connector into clip provided.

(4) Withdraw locking pin from comm cable red to allow reel to turn.

(5) Wind comm cable on reel using captive crank provided.

(6) Push captive crank into storage position and lock reel using captive pin at the reel connector.

(7) In truck cab, disconnect comm handset from connector 11 on secure comm speaker amplifier.

(8) Disconnect cable CX-12925/TLQ-15 from truck adapter kit and connector 1A12A3J2 (fig. 2-20.4).

(9) Disconnect cable 4A1W2 from 1A12A3J3 (fig. 2-20.4).

(10) Disconnect cable 1A18W11 from comm control unit and connector 1A12A3J4 (fig. 2-20.4).

(11) Disconnect ground cable 4A1W1 from shelter 1A12 radial connection (fig. 2-20.4).

(12) Raise engine hood and disconnect terminal leads of cable 4A1W3 from terminal boards on fender well in engine compartment (fig. 2-20.4).

(13) Under vehicle, release cable retainers that secure cables to underside of vehicle.

(14) On curbside of vehicle, remove four sheet metal screws securing aluminum door sill trim plate to door sill and remove trim plate.

(15) Raise floor mat on p side of vehicle to expose cable group dressed along edge of transmission tunnel.

(16) Pull cables back through hole in truck floor and separate cables. Disconnect cable 4A1W2 from secure comm speaker amplifier cable (fig. 2-20.4).

(17) Release straps that secure truck adapter kit to transmission tunnel

(18) Remove truck adapter kit, attached components, and cables and store in designated location.

(19) Replace floor mat on passenger side of vehicle and reinstall aluminum door sill trim plate.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. TOOLS, EQUIPMENT, AND LUBRICATION

3-1. General

Repair parts, tools, test equipment, and accessories issued with or authorized for use by the operator for the AN/TLQ-15 are listed in the maintenance allocation chart and TM 11-5895-372-24P.

3-2. Operator's Maintenance Materials

The maintenance materials listed below are the only items required for operator's maintenance of the AN/TLQ-15. The materials are not furnished as part of the AN/TLQ-15.

a. Cleaning brush, similar to the typewriter or toothbrush type. Use National stock number 7510-0178-8320.
b. Clean, lint-free cleaning cloths.
c. Trichlorotrifluoroethane. (NSN 6850-00-105-3084)
d. Screwdriver

Paragraph 3-3 deleted.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-4. General

NOTE

Refer to TM 750-244-2 for proper procedures for destruction of this equipment to prevent enemy use.

a. Operator/crew preventive maintenance is the systematic care, servicing and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain equipment in serviceable condition. To be sure that your Countermeasures Set is always ready for your mission, you must do scheduled preventive maintenance checks and services (PMCS).

(1) BEFORE OPERATION, perform your B PMCS to be sure that your equipment is ready to go.

(2) WEEKLY PMCS are important checks to keep serious problems from suddenly happening. Perform WEEKLY as well as BEFORE OPERATION PMCS if:

(a) You are the assigned operator and have not operated the item since the last WEEKLY.

(b) You are operating the item for the first time.

(3) When an item of equipment is reinstalled after removal, for any reason, perform the necessary B PMCS to be sure the Item meets the readiness reporting criteria.

(4) Use the ITEM NO. column in the PMCS table to get the number to be used in the TM ITEM NO. column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) when you fill out the form.

b. Routine checks like CLEANING, LUBRICATION, DUSTING, WASHING, CHECKING FOR FRAYED CABLES, STOWING ITEMS NOT IN USE, COVERING UNUSED RECEPTACLES, CHECKING FOR LOOSE NUTS AND BOLTS AND CHECKING FOR COMPLETENESS are not listed as PMCS checks. They are things that you should do any time you see they must be done. If you find a routine check like one of those listed in your PMCS, it is because other operators reported problems with this item.

NOTE

When you are doing any PMCS or routine checks, keep in mind the warnings and cautions.

WARNING

Never operate the generator or shelter until it has been properly grounded. Electrical defects in the load lines or equipment can cause death by electrocution when contact is made with an ungrounded system. Adequate ventilation should be provided while using TRICHLOROTRIFLUOROE-THANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRI-FLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately. Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size)

from being blown into the eyes or unbroken skin of the operator or other personnel. Goggles must be worn at all times while cleaning with compressed air. Compressed air shall not be used for cleaning purposes except where reduced to less than 29 pounds per square inch gage (psig) and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when Trichlorotrifluoroethane has been used.

NOTES

The PROCEDURES column in your PMCS charts instruct how to perform the required checks and services. Carefully follow these instructions and, if tools are needed or the chart so instructs, get organizational maintenance to do the necessary work.

If your equipment must be in operation all the time, check those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

c. Deficiencies that cannot be corrected must be reported to higher category maintenance personnel. Records I and reports of preventive maintenance must be made in accordance with procedures given in TM 38-750.

3-5. Operator/Crew Preventive Maintenance Checks and Services (Table 3-1).

Perform weekly as well as before operation PMCS if:

a You are the assigned operator and have not operated the item since the last weekly.

b. You are operating the item for the first time.

Paragraph 3-6 deleted.

Table 3-1. Operator/Crew Preventive Maintenance Check and Service

B-Before **W-Weekly**

Item No.	Interval B	Interval W	Item to be Inspected	Procedures: Check for and have repaired or adjusted as necessary	Equipment Is Not Ready/ Available If:
1		•	Grounding	Inspect ground rods and grounding electric connections to ensure clean tight connections. or equipment.	If personnel experience shock from bodily contact with shelter frame
2	•		Completeness	Check for completeness and satisfactory condition of the Countermeasures Set Report missing items	Any component required for equipment operation is missing.
3	•		AN/TLQ-15	Perform complete operational checkout of equipment and indicators as described in paragraphs 2-4 through 2-14	One or more receiving inoperative. One or transmitting modes inoperative.

*Do this check before each deployment to a mission location. This will permit any existing problems to be corrected before the mission starts The check does not need to be done again until redeployment.

Section III. TROUBLESHOOTING

3-7. Operator's Troubleshooting.

a. General. Operator's troubleshooting is limited to locating and changing lamps. Major repair and replacement procedures are to be accomplished at a higher category of maintenance.

b. Interlock Indicators. Twenty interlock indicators, located on the control unit, monitor the interlock circuits of the AN/TLQ-15. When a malfunction occurs in a given circuit, the associated indicator and all other indicators to the right of it go out; the last indicator to go out indicates the malfunctioning circuit. If any of the 20 interlock indicators go out and the equipment operates normally, an indicator lamp may be defective. If replacing that indicator lamp does not correct the trouble, report it to the next higher category of maintenance.

3-8. Repair and Replacement Procedures Operator repair and replacement procedures consist of the replacement of equipment and shelter lamps. Less accessible indicator lamps are to be replaced at a higher level of maintenance. Indicator lamps not covered by this manual should be replaced in accordance with instructions given in the applicable technical manuals listed in appendix A.

a. Shelter Dome Lights. Each overhead dome light (1A12A1, 1A12A2, and 1A12A4) contains two incandescent lamps (DS1 and DS2), one red and one white. Change defective lamps as follows:

(1) Remove six screws from inner ring holding lens.

(2) Remove defective lamp and replace with new lamp, P/N 307 or 311, red or white, as required.

(3) Install lens and inner ring, reusing the six screws.

b. All Chrome Shield Red Panel Lights. Change defective red indicator lamp as follows:

(1) Pull chrome light shield off fixture from operator's side of front panel.

(2) Press in and disengage bayonet base and remove lamp.

(3) Insert and engage bayonet base of new lamp MS 25231-1819R.

(4) Replace chrome light shield by pressing into place and turning it to direct light as required.

c. Control Unit.

(1) *HIGH VOLTAGE switch lamp*. Change defective lamps inside switch (1A2S4) as follows:

(a) Grasp, light screen assembly and pull from lampholder.

(b) Remove defective lamp from light screen assembly and replace with new lamp MS25237-327.

(c) Press light screen assembly firmly into lampholder.

(2) *Remainder of switch lamps*. Change defective lamps as follows:

(a) Grasp light screen assembly and pull from lampholder.

(b) Remove defective lamp and replace with new lamp MS25237-387.

(c) Press light screen assembly securely onto lampholder.

d. Rt Unit. Change defective yellow lampbutton on FREQ LOCK switch as follows:

(1) Unscrew lamp counterclockwise.

(2) Remove defective lamp and replace with new lamp MS 25237-328.

(3) Screw lamp clockwise into lamp-holder.

APPENDIX A

REFERENCES

AR 40-583	Control of Potential Hazards to Health From Microwave and Radio Frequency Radiation.
DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
SB 11-628	Headset, Electrical H-251/U, NSN 5965-00-043-3460 for use with Radar Set AN/PPS-5.
TB 9-2300-280-30	Tactical Vehicles: Installation of Universal Tiedown Anchors.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TB 43-0124	Maintenance and Repair Procedure for Shelters, Electrical Equipment S-141/G and S-141B/G (NSN 5410-00-752-9698); S-144/G, S-144A/G, S-144B/G, S-144C/G and S-144D/G (5410-00-542-2532); S-250/G (5410-00-999-4935); S-250/G (Shielded) (5410-00-489-6076); S-280/G (5410-00-999-5269); S-280A/G (5410-00-999-6022); S-280B/G (5410-00-117-2868); S-280B/G (Shielded) (5410-00-001-4093); S-318/G (5410-00-763-2339) and S-318A/G (5410-00-116-7086).
TM 5-2805-259-14	Operator, Organizational, Direct Support, and General Support Maintenance Manual: Engine, Gasoline 20 HP, Military Standard Models 4A084-2 (NSN 2805-00-925-3296) and 4A084-3 (NSN 2805-00-872-5972).
TM 65-4120-289-15	Operator's Organizational, Direct Support, General Support and Depot Maintenance Manual: Air Conditioner; Wall or Base Mounted; Air Cooled Self-Contained, Electric Motor Driven, 6000 BTU/HR, 115 V, 1-Phase, 2-Wire, 50/60-Cycle/(Redmanson Model CE-6A-60A) (NSN 4120-00-926-1161) and 208 V, 3-Phase, 4-Wire, 400-Cycle (Redmanson Model CE-6A-400A) (NSN 4120-00-926-1162).
TM 5-6115-275-14	Operator, Organizational, Intermediate (Field) (Direct Support and General Support) and Depot Maintenance Manual: Generator Set, Gasoline Engine Driven, Skid Mounted, Tubular Frame, 10 KW, AC, 120-208 V, 3-Phase, and 120-240 V, Single Phase, Less Engine: DOD Models MEP-018A, 60 Hz, (NSN 6115-00-889-1447) and MEP-023A, 400 Hz (6115-00-926-0843).
TM 9-2320-244-10	Operator's Manual: Truck, Cargo: 1 1/4-Ton, 4X4, M715 (NSN 2320-00-921-6365), W/Winch (2320-00-921-6366); Truck, Ambulance: 1 1/4-Ton, 4X4, M725 (2320-00-921-6369); Truck, Maintenance; 1 1/4-Ton, 4X4, M726 (2320-00-921-6370), W/Winch (2320-00-921-6833).
TM 9-2320-266-10	Operator's Manual: Truck, Cargo: 1 1/4-Ton, 4X4, M880 (NSN 2320-00-579-8942), M881 (2320-00-579-8943), M882 (2320-00-579-8957), M883 (2320-00-579-8959), M884 (2320-00-579-8985), M885 (2320-00-579-8989); 1 1/4-Ton, 4X2, M890 (2320-00-579-8991), M891 (2320-00-579-9046), M892 (2320-00-579-9052); Truck, Ambulance: 1 11/4-Ton, 4X4, M886 (2310-00-579-9078); 1 1/4-Ton, 4X2, M893 (2310-00-579-5679) and Truck, Telephone Maintenance: 1 1/4-Ton, 4 X 4, M888 (2320-01-044-0333).
TM 9-2330-202-14P	Operator's, Organizational Direct Support, and General Support Maintenance Manual (Including Repair Parts and Special Tools (List) for Trailer, Cargo: 3/4-Ton, 2-Wheel, M101 (NSN 2330-00-738-9509) and M101A1 (2330-00-898-6779); Chassis, Trailer: 3/4-Ton, 2-Wheel, M116 (2330-00-542-5987) and Ml 16A1 (2330-00-898-6780).

TM 11-6805-201-12	Operator and Organizational Maintenance Manual: Telephone Set TA-312/PT (NSN 5805-00543-0012).
TM 11-5820-401-12.	Operator's and organizational Maintenance Manual (Including Repair Parts and Special Tools List): Radio Set AN/VRC-12 (NSN 5820-00-223-7412), AN/VRC-43 (5820-00- 223-7415), AN/VRC-44 (6820-00-223-7417), AN/VRC-45 (5820-00-223-7418), AN/VRC-46 (5820-00-223-7433), AN/VRC-47 (5820-00-223-7434), AN/VRC-48 (5820-00- 223-7435), AN/VRC-49 (5820-00-223-7437), AN/VRC-54 (5820-00-223-7567) and AN/VRC-55 (5820-00-402-2265); Mounting MT-1029/VRC (5820-00-893-1323) and MT-1898/VRC (5820--893-1324); Antenna AT-912/VRC (5820-00-897-6357); Control Frequency Selector C-2742/VRC (5820-00-892-3343) and Control Radio Set C- 2299/VRC (5820-00-892-3340).
TM 11-56896-72-10-HR	Hand Receipt Manual Covering Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) for Countermeasures Set AN/TLQ-15 (NSN 5865-00-878-2650).
TM 11-5895-502-15	Operator's, Organizational Direct Support, General Support, and Depot Maintenance Manual: Modulation Signal Source MX-8052/GLQ (NSN 5895-00-133-8991).
TM 11-5895-503-15	Operator's Organizational Direct Support, General Support, and Depot Maintenance Manual: Indicator, Panoramic IP-922/GLQ (NSN 5895-00-133-8992).
TM 11-5965-257-15	Operator's Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools List: Handset H-1381U (NSN 5965- (0-892-0972).
TM 11-5965-260-24P	Organizational, Direct Sort and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools): Headset, Electrical H-140A/U (NSN 5965-00-892-1010).
TM 11-5965-280-16	Operator's Organizational Direct Support, General Support and Depot Maintenance Manual Including Repair Parts and Special Tools List: Handset H-1891GR (NSN 5965-00-069-8886).
TM 11-5985-262-15	Operator's Organizational Direct Support, General Support and Depot Maintenance Manual: Antenna AS-1729/VRC (NSN 5985-00-985-9024).
TM 11-6625-700-10	Operator's Manual: Digital Readout, Electronic Counter AN/USM-207 (NSN 6625-00-911-6368).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-5-32	Army Equipment Data Sheets: Generator Sets and Electric Power Plants, Truck and Trailer Mounted.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B
COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. Scope
This appendix lists integral components of and basic issue items for the AN/TLQ-15 to help you inventory items required for safe and efficient operation.

B-2. General
This Components of End Item List is divided into the following sections:

a Section II. Integral Components of the End Item These items, when assembled, comprise the AN/TLQ-15 and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the AN/TLQ-15 in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the AN/TLQ-15 during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. Explanation of Columns
a Illustration This column is divided as follows:

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

(2) *Item number*. The number used to identify item called out in the illustration.

b. *National Stock Number*. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. *Part Number*. Indicates the primary number used by the manufacturer, which control the and characteristics of the item by . means of its engineering drawings, specifications standards, , and inspection requirements to identify an item or range of items. Following the part number, the Federal Supply Code for Manufacturer (FSCM) is shown in parentheses.

d *Description* Indicates the Federal item name and, if required, a minimum description to identify the item.

e. *Location* The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f *Usable on Code*. Not applicable.

g. *Quantity Required (Qty Reqd*). This column lists the quantity of each item required for a complete major item.

h *Quantity.* This column is left blank for use during an inventory. Under the Rcvd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item at a later date; such as for shipment to another site.

(Next printed page is B-2)

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG.	(1) ILLUSTRATION (B) ITEM	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
1-1			RCVR-TRANS GRP, COUNTER-MEASURES OZ-49/TLQ-15(UNIT 1) (93346)			1		
1-2			COUPLER, ANTENNA 5252402-501 (1A1) (93346)			1		
1-2		5865-00-626-9052	CONTROL, COUNTER-MEASURES TRANSMITTING SET C-6484/TLQ-15 1A2) (80058)			1		
1-2		5865-00-626-9404	AMPLIFIER, RADIO FREQUENCY AM-4256/ TLQ-15 (1A3) (80058)			1		
1-2		5865-00-626-9405	RECEIVER-TRANSMITTER, RADIO RT-657/TLQ-15 (1A4) (80058)			1		
1-2		5985-01-020-8163	COUPLER, ANTENNA CU-1408/TLQ-15(1A5) (80058)			1		
1-2		5865-00-629-4774	POWER SUPPLY PP-4253/TLQ-15 (1A6) (80058)			1		
1-2		5865-00-629-4778	POWER SUPPLY PP-4254/TLQ-15 (1A7) (80058)			1		
1-4		5805-00-543-0012	TELEPHONE SET TA-312/PT (1A8) (80058)			1		
1-2		6625-00-631-5499	COUNTER, ELECTRONIC, DIGITAL READOUT CP-1053/TLQ-15 IN-CLUDING CABLE ASSEMBLIES, RADIO FREQUENCY W1 AND W2 (1A9) (80058)			1		
1-4		5805-00-503-3345	KEY, TELEGRAPH KY-116/U (1A10) (80058)			1		
1-2			RACK, ELECTRICAL EQUIPMENT 3253596-501(1A11) (93346)			1		
1-1		5410-00-489-6076	SHELTER S-250/G (MODIFIED) (1A12) (80058)			1		
1-3		6110-00-624-0657	DISTRIBUTION BOX J-2534/TLQ-15(1A13) (80058)			1		
1-3			FAN, VENTILATING 4254231-501(1A14) (93346)			1		
1-4		4120-00-029-1138	AIR CONDITIONER ASSEMBLY (1A15) (80058)			1		
1-2		5865-00-133-8991	MODULATOR MX-8052/GLQ (1A16) (80058)			1		
1-2		5895-00-133-8992	INDICATOR, PANORAMIC IP-922/GLQ (1A17) (80058)			1		
1-3			ENCLOSURE ASSEMBLY, T-SEC 6250394-501 (1A18) (93346)			1		
1-2		4520-00-624-0655	HEATER, SPACE, ELECTRIC HD-887/ TLQ-15 (1A19) (93346)			1		
			CONTROL ASSEMBLY, EXHAUST 6250369-501 (1A20) (93346)			1		
1-2		9165-00 017-3663	FILTER ASSEMBLY, LOW PASS F-1300/ TLQ-15 (1A21) (80058)			1		
1-2		5865-01-008-3915	DUMMY LOAD DA-396/TLQ-15 (1A22) (80058)			1		

SECTION II INTERNAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG.	(1) ILLUSTRATION (B) ITEM	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
1-2			PANEL, POWER DISTRIBUTION 425261-501 (1A23)	(93346)			1		
1-4		5965-00-043-3460	HEADSET H-251A/U (1A24)	(80058)			1		
1-2		5965-00-069-8886	HANDSET H-189/GR (1A25)	(80058)			1		
1-2		5965-00-179-7762	MICROPHONE M-80/G (1A26)	(80058)			1		
1-2			DRAWER ASSEMBLY 4254265-501 (1A27)	(93146)			1		
1-2			SHELF, UTILITY 425290-501 (1) (93346)				1		
1-2		7105-00-792-7529	CHAIR, FOLDING (1A29)	(09103)			1		
1-4		9920-00-113-9745	ASH RECEIVER TOBACCO (1A31)	(09103)			1		
			HANDSET-HEADSET H-338/TLQ-15 (1A32)	(80058)			1		
1-5			AMPLIFIER, AUDIO FREQUENCY A-494/U (1A34)	(80058)			1		
1-5			AMPLIFIER, LOUDSPEAKER A-4979/GR (1A35)	(80058)			1		
1-5			LOUDSPEAKER, PERMANENT MAGNET LS-44/U (1A3)	(80058)			1		
1-5			CONTROL BOX, REMOTE C-8156/TLQ-15 (1A37)	(80058)			1		
			CABLE ASSEMBLIES, RADIO FREQUENCY (1W1-1W21)	(93346)			21		
1-1			COMM-PWR GEN GRP. TRAILER MID OP-139/TLQ-15 (UNIT 2)	(93346)			1		
1-6		6115-00-789-3656	GENERATOR SET, GASOLINE ENGINE, TRAILER MOUNTED PU- 681/TLQ-15 (MODIFIED) (2A2)	(80058)			1		
1-7			CABINET ELECTRICAL EQUIPMENT 6250393-501 (2A3)	(93346)			1		
1-6			ANTENNA AS-1729/VRC (2A4)	(80058)			1		
1-6			CASE, SPARE PARTS STORAGE 4450170-501 (2A5)	(93346)			1		
1-6		5865-01-017-0783	ANTENNA AS-1738/ TLQ-15 (2A6)	(80058)			1		
1-6			BASE, ANTENNA MOUNTING, AS-1738/ TLQ-15 (2A7)	(93346)			1		
1-7		4030-00-181-5260	STAKES GUY GP-25 (2A11)	(80063)			8		
1-7		5865-00-626-9054	CABLE ASSEMBLY AND REEL RL-267/TLQ-15 (2A12)	(93346)			1		
1-6		5865-00-626-9051	COUNTERPOISE, ANTENNA MX-6727/TLQ-15 IN-CLUDING COUNTERPOISES, ANTENNA A1-A4 AND GROUNDING SETS. TRANSMISSION LINE A5-A8 (2A14)	(93346)			1		

SECTION II INTERNAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG.	(1) ILLUSTRATION (B) ITEM	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
1-4		5965-00-043-3460	HEADSET H-251A/A (2A15)	(80058)			1		
1-7		5820-00-892-0871	RADIO SET AN/VXC-47 INCLUDING RECEIVER, RADIO R-442/VRC, RECEIVER-TRANSMITTER, RADIO RT-524/VRC, AND ANTENNA ASSEMBLY (2A18)	(80058)			1		
1-7		5865-00-626-8761	CABLE ASSEMBLY AND REEL RL-268/TLQ-15 (2A18)	(93346)			1		
1-7			INTERCONNECTING BOX 4254263-501 (2A24)	(93346)			1		
2-23		5995-00-629-6492	CABLE ASSEMBLY, POWER, ELECTRICAL CX-12532/TLQ-15 (2A23)	(80058)			1		
2-23			SUPPRESSER ASSEMBLY 3253417-501 (2A24)	(93346)			1		
		5865-00-626-9052	CABLE ASSEMBLY SET, ELECTRICAL MX-8879/TLQ-15 (UNIT 3)	(80058)			1		
1-8		5975-01-057-5623	MOUNTING BASE, ELECTRICAL MT-4965/TLQ-15 (UNIT 4)	(93346)			1		

SECTION III. BASIC ISSUE ITEM

(1) ILLUSTRATION (A) FIG.	(1) ILLUSTRATION (B) ITEM	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
1-4		4210-00-270-4512	FIRE EXTINGUISHER, C02, TYPE S, SIZE 5 (1A30)	(80063)			1		
2-23		5120-00-203-4656	HAMMER SLEDGE HM1 (2A19)	(80063)			1		
2-23		2540-00-846-8483	LADDER, VEHICLE BOARDING SCD147189	(80063)			1		
			BAG STORAGE 4254799-1 (P/O UNIT 3)	(93346)			1		
			PUBLICATION	SUBJECT					
			TB 750-240	5-250/G					
			TM 5-4120-289-15	AIR CONDITIONER					
			TM 5-6115-450-15	GENERATOR SET					
			TM 11-5805-201-12	TA-312/PT					
			TM 11-5820-401-12	AN/VRC-47					
			TM 11-5895-372-10	AN/TLQ-15					
			TM 11-5895-502-15	MX-8052/GLQ					
			TM 11-5895-503-15	IP-922/GLQ					
			TM 11-6625-700-10	AN/USM-207					

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of the AN/TLQ-15.

C-2. General

This list identifies items that do not have to accompany the AN/TLQ-15 and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. Explanation of Listing

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description.

SECTION II ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION FSCM AND PART NUMBER	USABLE ON CODE	(3) U/M	(4) QTY AUTH
2320-00-921-6365	TRUCK, CARGO: 1-1/4-TON 4 X 4, M715( ), OR		EA	1
2320-00-579-8959	M883( ), OR			
2320-00-579-8985	M884( )			
	ENCODER\DECODER KYB-6-T-SEC (1A33) (80058)		EA	1
6135-00-542-6216	BATTERY, DRY, 1.5-VOLT BA-30 (80204)		EA	2

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/TLQ-15. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical,, Class V, Repair Parts, and Heraldic Items).

D-2. Explanation of Columns

a. Column 1-Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2-Level. This column identifies the lowest level of maintenance that requires the listed item.

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

c. Column 3-National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4-Description. Indicates the Federal item name and if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue that will satisfy your requirements.

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UNIT OF MEAS.
1	C	7510-00-281-5234	PENCILS, LEAD P/W 45 (06542)	DZ
2	C	8305-00-222-2423	CLOTH, COTTON (CHEESECLOTH) 20 YARD BOLT CCC-C-44 OZ (81348)	TD
3	C	7930-00-249-8036	DETERGENT, GENERAL PURPOSE 5 POUND FAIL P-D-220C	LB
4	C	9150-00-273-2389	LUBRICATING OIL, INTERNAL COMBUSTION ENGINE, SUB ZERO BRAY C0200 (98308)	QT
5	C	6850-00-105-3084	TRICHLOROTRIFLUOROETHANE (CLEANING AGENT) FREON TYPE TF	PT

INDEX

INDEX

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- Armies (1)
- Instl (1) except
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  - Ft Carson (5)
  - SAAD (30)
  - TOAD (14)
  - ATAD (10)
  - LBAD (10)
  - SHAD (8)
- USACC (2)
- HISA (Ft Monmouth) (83)
- Ft Richardson (ECOM Ofc) (1)
- Svc Colleges (1)
- USASESS (5)
- USAERDAA (1)
- USAERDAW (1)
- Sig FLDMS (1)
- Units org under fol TOE:
  - 29-134 (1)
  - 29-136 (1)

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

* U.S. GOVERNMENT PRINTING OFFICE : 1994 0 - 300-421 (01073)

TABLE 2-21. Modulation and Keying Selection Chart (Sheet 1 of 2)

		Modulation Source														Rt Unit					
MODE	KEYING	CONT KEYING	PERIODIC KEYING	RANDOM KEYING	HAND KEYING	VOICE	NOISE	TONES	MOD OFF	NOISE BW KC/S	N/T RATIO	TONE SEL KC/S	TONE FREQ KC/S	SPEED WPM-CPS	RANDOM RATIO	MODULATION	METER SELECTOR SWITCH	AM MOD	DEVIATION	CHIRP RATE	REMARKS
CW	Continuous	On							Off							OFF					Control unit XMTR KEYED indicator flashes on and off at selected keying mode. Connect key to HANDKEY connector on modulation source for hand keying mode. Control unit XMTR KEYED indicator flashes on and off at selected keying mode and AM. ON indicator lights. Connect key to HAND KEY connector on modulation source for hand keying mode. Connect mic to MICROPHONE connector on modulation source for voice mode. For am. operation set RF OUTPUT control ccw; adjust AM MOD control for 50% as read on METER SELECTOR meter; and then adjust RF OUTPUT control for 2kW as read on control unit FORWARD POWER meter.
	Random			On					Off					AR	AR	OFF					
	Hand				On				Off							OFF					
AM-TONE	Continuous	On						On	On			AR	AR			AM	AM MOD	50%			
	Random			On				On	On			AR	AR	AR	AR	AM	AM MOD	50%			
	Hand				On			On	On			AR	AR			AM	AM MOD	50%			
AM-NOISE	Continuous	On					On		On	AR						AM	AM MOD	50%			
	Random			On			On		On	AR				AR	AR	AM	AM MOD	50%			
	Hand				On		On		On	AR						AM	AM MOD	50%			
AM-TONE and NOISE	Continuous	On					On	On	On	AR	AR	AR	AR			AM	AM MOD	50%			
	Random			On			On	On	On	AR	AR	AR	AR	AR	AR	AM	AM MOD	50%			
	Hand				On		On	On	On	AR	AR	AR	AR			AM	AM MOD	50%			
AM-VOICE						On			On							AM	AM MOD	50% modulation			
AM/FM-TONE	Continuous	On						On	On			AR	AR			AM/FM	AM MOD and then DEV/FSK	50%	AR		Control unit XMTR KEYED indicator flashes on and off at selected keying mode; AM. ON indicator lights. Connect key to HAND KEY connector on modulation source for hand keying mode. Connect mic to MICROPHONE connector on modulation source for voice mode. For am. operation set RF OUTPUT control ccw; adjust AM MOD control for 50% as read on METER SELECTOR meter; and then adjust RF OUTPUT control for 2kW as read on control unit FORWARD POWER meter.
	Random			On				On	On			AR	AR	AR	AR	AM/FM	AM MOD and then DEV/FSK	50%	AR		
	Hand				On			On	On			AR	AR			AM/FM	AM MOD and then DEV/FSK	50%	AR		
AM/FM-NOISE	Continuous	On					On		On	AR						AM/FM	AM MOD and then DEV/FSK	50%	AR		
	Random			On			On		On	AR				AR	AR	AM/FM	AM MOD and then DEV/FSK	50%	AR		
	Hand				On		On		On	AR						AM/FM	AM MOD and then DEV/FSK	50%	AR		
AM/FM-NOISE and TONE	Continuous	On					On	On	On	AR	AR	AR	AR			AM/FM	AM MOD and then DEV/FSK	50%	AR		
	Random			On			On	On	On	AR	AR	AR	AR	AR	AR	AM/FM	AM MOD and then DEV/FSK	50%	AR		
	Hand				On		On	On	On	AR	AR	AR	AR			AM/FM	AM MOD and then DEV/FSK	50%	AR		
AM/FM-VOICE						On			On							AM/FM	AM MOD and then DEV/FSK	50% modulation	AR		

Table 2-21. Modulation and Keying Selection Chart (Sheet 2 of 2)

		Modulation Source														Rt Unit					
MODE	KEYING	CONT KEYING	PERIODIC KEYING	RANDOM KEYING	HAND KEYING	VOICE	NOISE	TONES	MOD OFF	NOISE BW KC/S	N/T RATIO	TONE SEL KC/S	TONE FREQ KC/S	SPEED WPM-CPS	RANDOM RATIO	MODULATION	METER SELECTOR SWITCH	AM MOD	DEVIATION	CHIRP RATE	REMARKS
FM-TONE	Continuous	On						On	On			AR	AR			FM/CHIRP	DEV/FSK		AR	OFF	Control unit XMTR KEYED indicator flashes on and
	Random			On				On	On			AR	AR			FM/CHIRP	DEV/FSK		AR	OFF	off at selected keying mode.
	Hand				On			On	On			AR	AR			FM/CHIRP	DEV/FSK		AR	OFF	Connect key to HAND KEY connector on modulation source for hand keying mode.
FM-NOISE	Continuous	On					On		On	AR						FM/CHIRP	DEV/FSK		AR	OFF	Connect mic to MICROPHONE connector
	Random			On			On		On	AR				AR	AR	FM/CHIRP	DEV/FSK		AR	OFF	on modulation source for voice mode.
	Hand				On		On		On	AR						FM/CHIRP	DEV/FSK		AR	OFF	
FM-TONE & NOISE	Continuous	On					On	On	On	AR	AR	AR	AR			FM/CHIRP	DEV/FSK		AR	OFF	
	Random			On			On	On	On	AR	AR	AR	AR	AR	AR	FM/CHIRP	DEV/FSK		AR	OFF	
	Hand				On		On	On	On	AR	AR	AR	AR			FM/CHIRP	DEV/FSK		AR	OFF	
FM-VOICE						On			On							FM/CHIRP	DEV/FSK		AR	OFF	
FM/CHIRP	Random			On					Off					AR	AR	FM/CHIRP	DEV/FSK		AR	AR	Control unit XMTR KEYED indicator flashes on and off at selected keying mode. Connect
	Hand				On				Off							FM/CHIRP	DEV/FSK		AR	AR	key to HAND KEY connector on modulation source for hand keying mode.
FSK	Periodic		On						Off					AR		FSK	DEV/FSK		AR		Control unit XMTR KEYED indicator flashes on and off at selected keying mode.
	Random			On					Off					AR	AR	FSK	DEV/FSK		AR		Connect key to HAND KEY connector on modulation source for hand keying mode.
	Hand				On				Off							FSK	DEV/FSK		AR		
DSBSC	Same modulation/keying modes and equipment control settings as AM.															DSBSC	RF OUTPUT				
DSBSC/FM	Same modulation/keying modes and equipment control settings as AM/FM.															DSBSC/FM	DEV/FSK		AR		

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