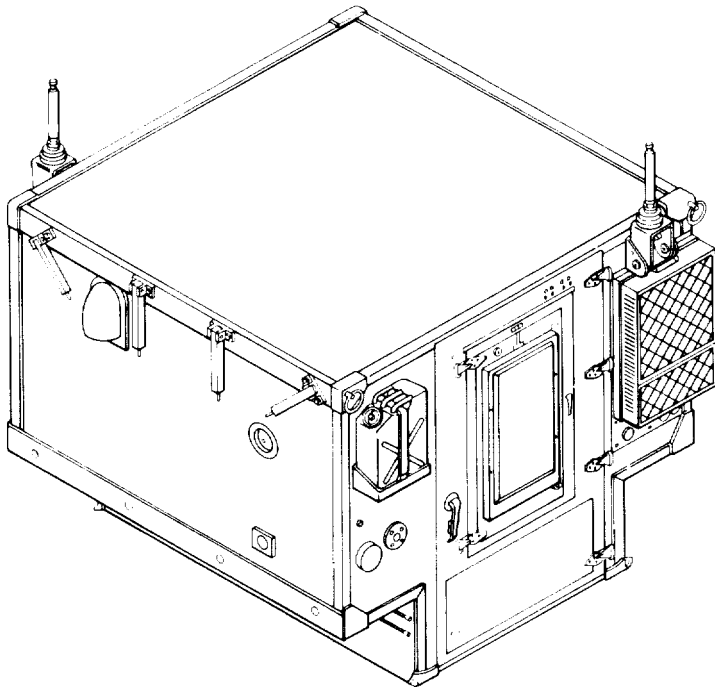


TECHNICAL MANUAL

**DIRECT SUPPORT AND GENERAL SUPPORT  
MAINTENANCE MANUAL**



PRINCIPLES OF OPERATION  
PAGE 1-7

DIRECT SUPPORT  
TROUBLESHOOTING  
PAGE 2-2

DIRECT SUPPORT MAINTENANCE  
PROCEDURES  
PAGE 2-40

**RADIO TELETYPEWRITER SETS**

**AN/GRC-122 (NSN 5815-00-401-9720)**  
**AN/GRC-122A (NSN 5815-00-167-7998)**  
**AN/GRC-122B (NSN 5815-00-937-5295)**  
**AN/GRC-122C (NSN 5815-01-095-1211)**  
**AN/GRC-122D (NSN 5815-01-096-0428)**  
**AN/GRC-122E (NSN 5815-01-095-1212)**  
**AN/GRC-142 (NSN 5815-00-401-9720)**  
**AN/GRC-142A (NSN 5815-00-168-1556)**  
**AN/GRC-142B (NSN 5815-00-443-5511)**  
**ANIGRC-142C (NSN 5815-01-100-6815)**  
**AN/GRC-142D (NSN 5815-01-104-7264)**  
**AN/GRC-142E (NSN 5815-01-095-6258)**

Change

No. 2

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 1 October 1994

**Direct Support and General Support  
Maintenance Manual  
RADIO TELETYPEWRITER SETS**

<b>AN/GRC-122 (NSN 5815-00-401-9719) (EIC: GFE)</b>	<b>AN/GRC-142 (NSN 5815-00-401-9720) (EIC: GFF)</b>
<b>AN/GRC-122A (NSN 5815-00-167-7998) (EIC: GFA)</b>	<b>AN/GRC-142A (NSN 5815-00-168-1556) (EIC: GFB)</b>
<b>AN/GRC-122B (NSN 5815-00-937-5295) (EIC: GFJ)</b>	<b>AN/GRC-142B (NSN 5815-00-443-5511) (EIC: GFG)</b>
<b>AN/GRC-122C (NSN 5815-01-095-1211) (EIC: GFL)</b>	<b>AN/GRC-142C (NSN 5815-01-100-6815) (EIC: GFR)</b>
<b>AN/GRC-122D (NSN 5815-01-096-0428) (EIC: GFP)</b>	<b>AN/GRC-142D (NSN 5815-01-104-7264) (EIC: GFT)</b>
<b>AN/GRC-122E (NSN 5815-01-095-1212) (EIC: GFM)</b>	<b>AN/GRC-142E (NSN 5815-01-095-6258) (EIC: GFN)</b>

**USED WITH OR WITHOUT INSTALLATION  
KIT, ELECTRONIC EQUIPMENT MODIFICATION  
KIT MK-2488/G**

TM 11-5815-334-34, 5 March 1965, is changed as follows:

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2. 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 page.

*Remove pages*

i through v (vi Blank)  
1-1 through 14  
2-1 and 2-2  
A-3 and A4

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i through v (vi Blank)  
1-1 through 14  
2-1 and 2-2  
A-3 and A-4

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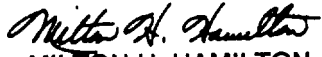
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*Administrative Assistant to the  
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CHANGE

No. 1

HEADQUARTERS,  
DEPARTMENT OF THE ARMY,  
WASHINGTON, DC, 15 January 1992

**Direct Support and General Support  
Maintenance Manual**

**RADIO TELETYPEWRITER SETS**

**AN-GRC-122 (NSN 5815-00-401-9719) (EIC: GFE) AN/GRC-142 (NSN 5815-00-401-9720) (EIC: GFF)  
AN/GRC-122A (NSN 5815-00-167-7998) (EIC: GFA) AN/GRC-142A (NSN 5815-00-168-1556) (EIC: GFB)  
AN/GRC-122B (NSN 5815-00-937-5295) (EIC: GFJ) AN/GRC-142B (NSN 5815-00-443-5511) (EIC: GFG)  
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AN/GRC-122E (NSN 5815-01-095-1212) (EIC: GFM) AN/GRC-142E (NSN 5815-01-095-6258) (EIC: GFN)**

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*Remove pages*

i and ii  
1-1 and 1-2  
A-1 and A-2  
FO-1  
FO-2  
FO-5 and FO-6  
FO-7  
FO-10 through FO-12  
FO-14  
FO-16 and FO-17  
FO-19 and FO-20

*Insert pages*

i and ii  
1-1 and 1-2  
A-1 and A-2  
FO-1 and FO-1.1  
FO-2  
FO-5 and FO-6  
FO-7  
FO-10 through FO-12  
FO-14  
FO-16 and FO-17  
FO-19 through FO-21

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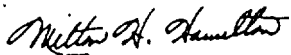
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GORDON R. SULLIVAN  
*General, United States Army*  
*Chief of Staff*

Official:



MILTON H. HAMILTON  
*Administrative Assistant to the*  
*Secretary of the Army*

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requirements for TM 11-5815-334-34.



**5**

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

**1**

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

**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 WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL**

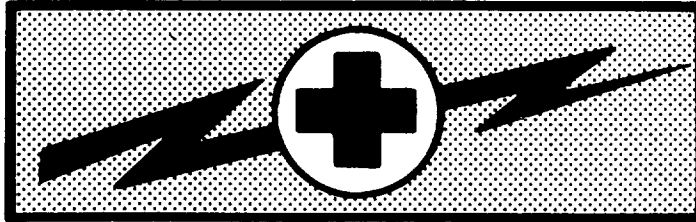
**4**

**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



## WARNING

### HIGH VOLTAGE

IS USED IN THE OPERATION OF THIS EQUIPMENT

### DEATH ON CONTACT

MAY RESULT IF PERSONNEL FAIL TO OBSERVE SAFETY PRECAUTIONS

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to touch high-voltage connections of 115 volt ac input when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

WARNING Do not be misled by the term "low voltage". Potentials as low as 50 volts may cause death under adverse conditions.

For Artificial Respiration, refer to FM 21-11.

**WARNING**

## HIGH VOLTAGE

is used in this equipment.

## DEATH ON CONTACT

MAY RESULT IF SAFETY PRECAUTIONS

ARE NOT OBSERVED.

Remove all rings, watches and jewelry before turning power on.

Make certain you are not grounded when working inside the equipment with power turned on. Do not attempt internal service or adjustment unless another person is present who is capable of rendering first aid and resuscitation. A periodic review of safety precautions in TB 385-4, Safety Precautions for Maintenance of Electrical/Electronic Equipment, is recommended.

**WARNING**

## TRICHLOROTRIFLUOROETHANE

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves, and an apron which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

**WARNING**

## COMPRESSED AIR

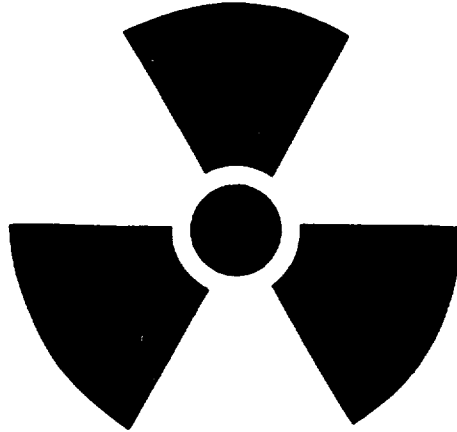
Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. Compressed air shall not be used for cleaning purposes except where reduced to less than 29 psi, and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when TRICHLOROTRIFLUOROETHANE has been used.

**WARNING**

Overloading inverter PU-724/G or PU-724A/G will cause component failure. Do not exceed 400 watt rating. Use PU-724/G or PU-724A/G for authorized equipment only.



# WARNING RADIATION HAZARD



**RADIOACTIVE MATERIAL  
CONTROLLED DISPOSAL REQUIRED  
ACCOUNTABILITY NOT REQUIRED**

**STD RW-2**

Meter	Ra226	1.0uCi	6625-00-257-1103
Meter	Ra 226	0.6uCi	6625-00-226-5680
Meter arbitrary scale	Ra 226	1.0uCi	6625-00-226-5679
Meter, arbitrary scale	Ra 226	1.0uCi	6625-00-226-5681

Radiation Hazard Information: The following radiation hazard information must be read and understood by all personnel operating or repairing Radio Teletypewriter Sets AN/GRC-122/142(\*).

Hazardous radioactive materials are present in the above listed components of the MD-522/GRC, RT-662/GRC, RT-824/GRC, and the AM-3349/GRC. The components are potentially hazardous when broken. See qualified medical personnel and the local Radiological Protection Officer (RPO) immediately if you are exposed to or cut by broken components. First aid instructions are contained in TB 43-0116, TB 43-0122, and AR 755-15.

NEVER place radioactive components in your pocket.

Use extreme care NOT to break radioactive components while handling them.

NEVER remove radioactive components from cartons until you are ready to use them.

If any of these components are broken, notify the local RPO immediately. The RPO will survey the immediate area for radiological contamination and will supervise the removal of broken components.

The above listed radioactive components *will not* be repaired or disassembled.

Disposal of broken, unserviceable, or unwanted radioactive components will be accomplished in accordance with the instructions in AR 755-15.

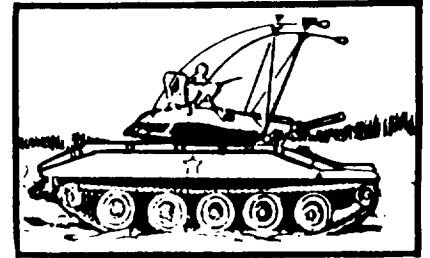
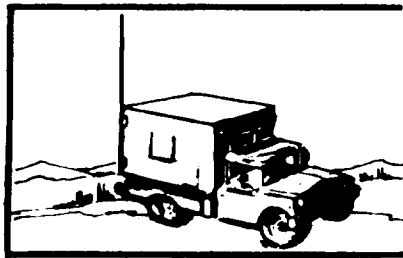
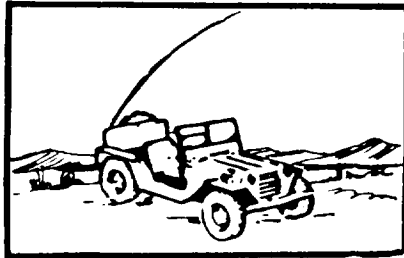
# WARNING

SERIOUS INJURY OR EVEN DEATH CAN HAPPEN IF THE FOLLOWING ARE NOT CAREFULLY OBSERVED WHEN INSTALLING AND USING THE ANTENNAS USED WITH YOUR RADIO SETS.

**BEFORE ANY  
MISSION FIND  
OUT**

1. ARE THERE ANY POWERLINES IN YOUR AREA OF OPERATION?
2. HOW HIGH ARE THESE POWERLINES?
3. HOW TALL ARE THE POLES OR TOWERS CARRYING POWERLINES?

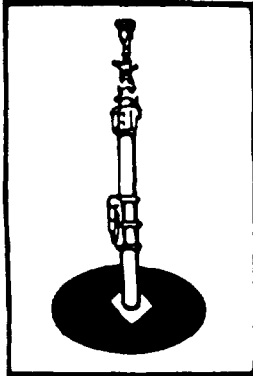
## MOBILE OPERATION WITH WHIP ANTENNAS



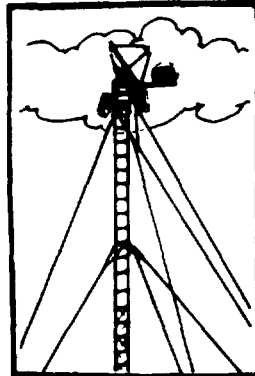
### DO NOT STOP YOUR VEHICLE UNDER POWER LINES.

- IF POSSIBLE, TRY TO MAINTAIN MOBILE COMMUNICATIONS WITH YOUR ANTENNA(S) TIED DOWN.
- MAKE SURE AN ANTENNA TIP CAP IS SECURELY TAPED ON THE END OF EACH WHIP ANTENNA.
- DO NOT LEAN AGAINST OR TOUCH A WHIP ANTENNA WHILE THE TRANSMITTER IS ON.
- DURING CROSS-COUNTRY OPERATION. DO NOT ALLOW ANYONE TO STICK AN ARM, LEG OR WEAPON OVER THE SIDES OF THE VEHICLE. IF YOUR ANTENNA ACCIDENTALLY TOUCHES A POWERLINE AND A LEG, ARM OR WEAPON CONTACTS A DAMP BUSH OR THE GROUND, A SERIOUS OR FATAL ACCIDENT CAN HAPPEN.
- IF YOU ARE NOT SURE THAT AN ANTENNA ON YOUR VEHICLE WILL CLEAR A POWERLINE, STOP BEFORE YOU GET CLOSE TO THE POWERLINE AND EITHER CAREFULLY TIE DOWN THE ANTENNA OR REMOVE ANTENNA SECTIONS TO MAKE SURE THAT YOU CAN SAFELY DRIVE UNDER THE POWER LINE.

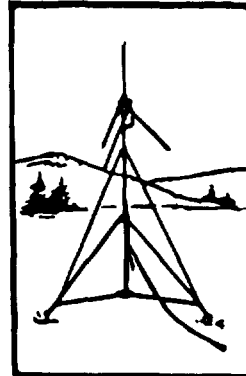
# FIXED OPERATION WITH LONG RANGE ANTENNAS WARNING



TELESCOPING ANTENNA  
MAST



TYPICAL TOWER



EXTENDED RANGE  
ANTENNA



DOUBLET ANTENNA

## NEVER ERECT THESE LONG RANGE ANTENNAS DIRECTLY UNDER POWER LINES.

IF YOU MUST ERECT THESE LONG RANGE ANTENNAS NEAR POWERLINES. POWERLINE POLES OR TOWERS, OR BUILDINGS WITH OVERHEAD POWERLINE CONNECTIONS, NEVER PUT THE ANTENNA CLOSER THAN TWO TIMES THE ANTENNA HEIGHT FROM THE BASE OF THE POWERLINE, POLE, TOWER OR BUILDINGS.

## NEVER ATTEMPT TO ERECT ANY LONG RANGE ANTENNA WITHOUT A FULL TEAM.

BEFORE ERECTING ANY LONG RANGE ANTENNA, INSPECT ALL THE PARTS MAKING UP THE ANTENNA KIT. DO NOT ERECT THE ANTENNA IF ANY PARTS ARE MISSING OR DAMAGED.

DO AS MUCH OF THE ASSEMBLY WORK AS POSSIBLE ON THE GROUND.

WHEN ERECTING THE ANTENNA, ALLOW ONLY TEAM PERSONNEL IN THE ERECTION AREA.

MAKE SURE THAT THE AREA FOR THE ANCHORS IS FIRM. IF THE GROUND IS MARSHY OR SANDY, GET SPECIFIC INSTRUCTIONS FROM YOUR CREW CHIEF OR SUPERVISOR ON HOW TO REINFORCE THE ANCHORS.

WHEN SELECTING LOCATIONS FOR ANCHORS, AVOID TRAVELED AREAS AND ROADS. IF YOU CANNOT AVOID THESE AREAS, GET SPECIFIC INSTRUCTIONS FROM YOUR SUPERVISOR AS TO WHAT CLEARANCE YOUR GUY WIRES AND ROPES MUST HAVE OVER THE TRAVELED AREAS AND ROAD.

CLEARLY MARK ALL GUY WIRES AND ROPES WITH THE WARNING FLAGS OR SIGNS SUPPLIED BY YOUR UNIT. IN AN EMERGENCY, USE STRIPS OF WHITE CLOTH AS WARNING STREAMERS.

IF YOU SUSPECT THAT POWERLINES HAVE MADE ACCIDENTAL CONTACT WITH YOUR ANTENNA, STOP OPERATING, ROPE OFF THE ANTENNA AREA, AND NOTIFY YOUR SUPERIORS.

IF THE WEATHER IN YOUR AREA CAN CAUSE ICE TO FORM ON YOUR LONG RANGE ANTENNA AND ITS GUY WIRES AND ROPES, ADD EXTRA GUYS TO SUPPORT THE SYSTEM, ROPE OFF THE AREA AND POST IT WITH WARNING SIGNS LIKE "BEWARE OF FALLING ICE."

DO NOT TRY TO ERECT ANY ANTENNA DURING AN ELECTRICAL STORM.

KEEP A SHARP EYE ON YOUR ANCHORS AND GUYS. CHECK THEM DAILY AND IMMEDIATELY BEFORE AND AFTER BAD WEATHER.

Direct Support and General Support  
 Maintenance Manual

RADIO TELETYPEWRITER SETS

AN/GRC-122	(NSN 5815-00-401-9719)	(EIC: GFE)
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AN/GRC-122D	(NSN 5815-01-096-0428)	(EIC: GFP)
AN/GRC-122E	(NSN 5815-01-095-1212)	(EIC: GFM)
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AN/GRC-142D	(NSN 5815-01-104-7264)	(EIC: GFT)
AN/GRC-142E	(NSN 5815-01-095-6258)	(EIC: GFN)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, NJ 07703-5007. A reply will be furnished direct to you.

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• This manual supersedes TM 11-5815-33435, 12 April 1972, including all Changes.

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GLOSSARY      .....	Glossary 1
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### HOW TO USE THIS MANUAL

This manual is designed to help you maintain Radio Teletypewriter **Sets AN/GRC-122/142(\*)**.

The table of contents on the front cover is provided for quick reference to important information. There is also an alphabetical index in the back of the book to help locate specific information.

Measurements in this manual are given in both US standard and metric units. A metric to US standard conversion chart can be found on the inside back cover.

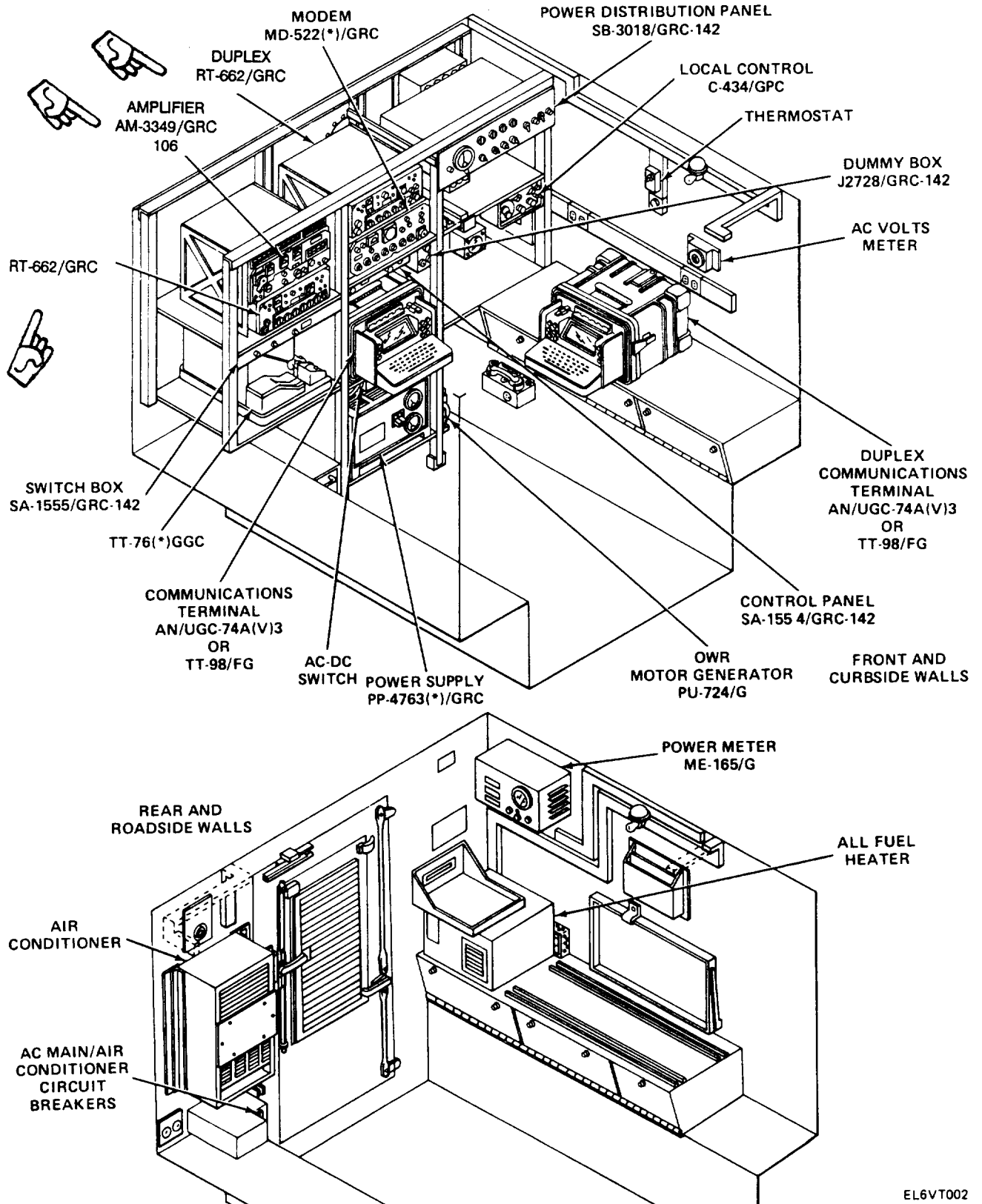
Read all preliminary information found at the beginning of each procedure. It contains important directions which must be followed to perform the task correctly.

Warning pages are located in the front of this manual. You should learn the warnings before doing maintenance on the equipment.

Paragraphs in this manual are numbered by chapter and order of appearance within a chapter. A subject index appears at the beginning of each chapter, breaking the chapter into sections. A more specific subject index is located at the beginning of each section to help you find the exact paragraph you are looking for.

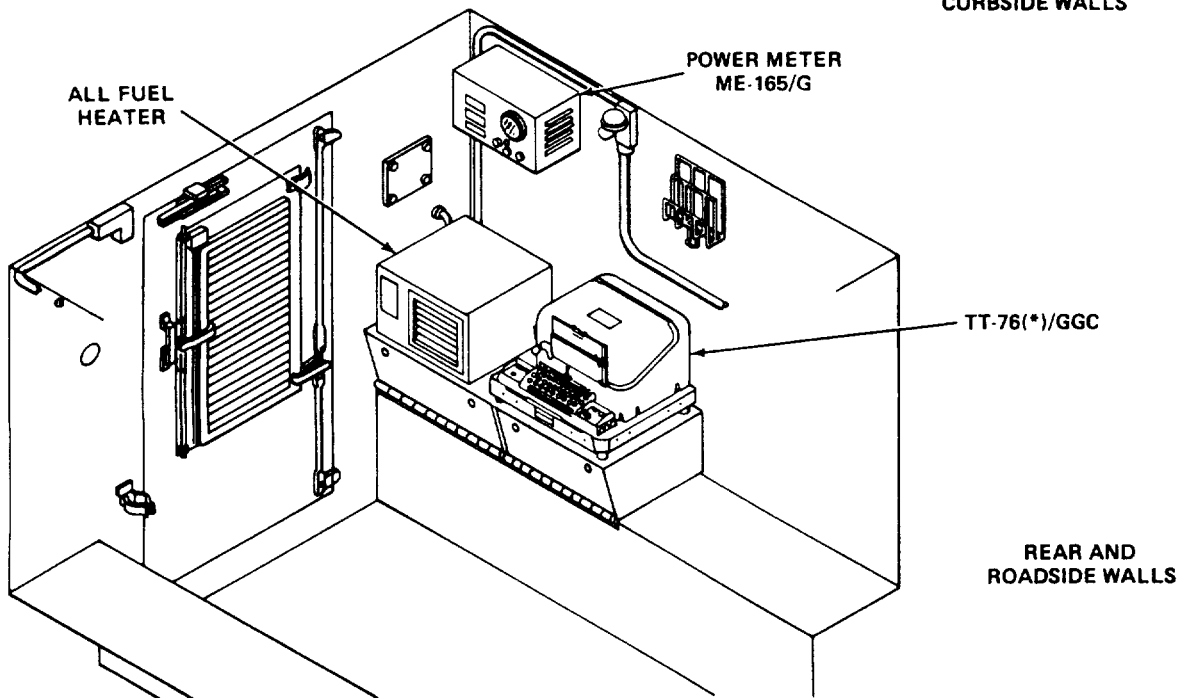
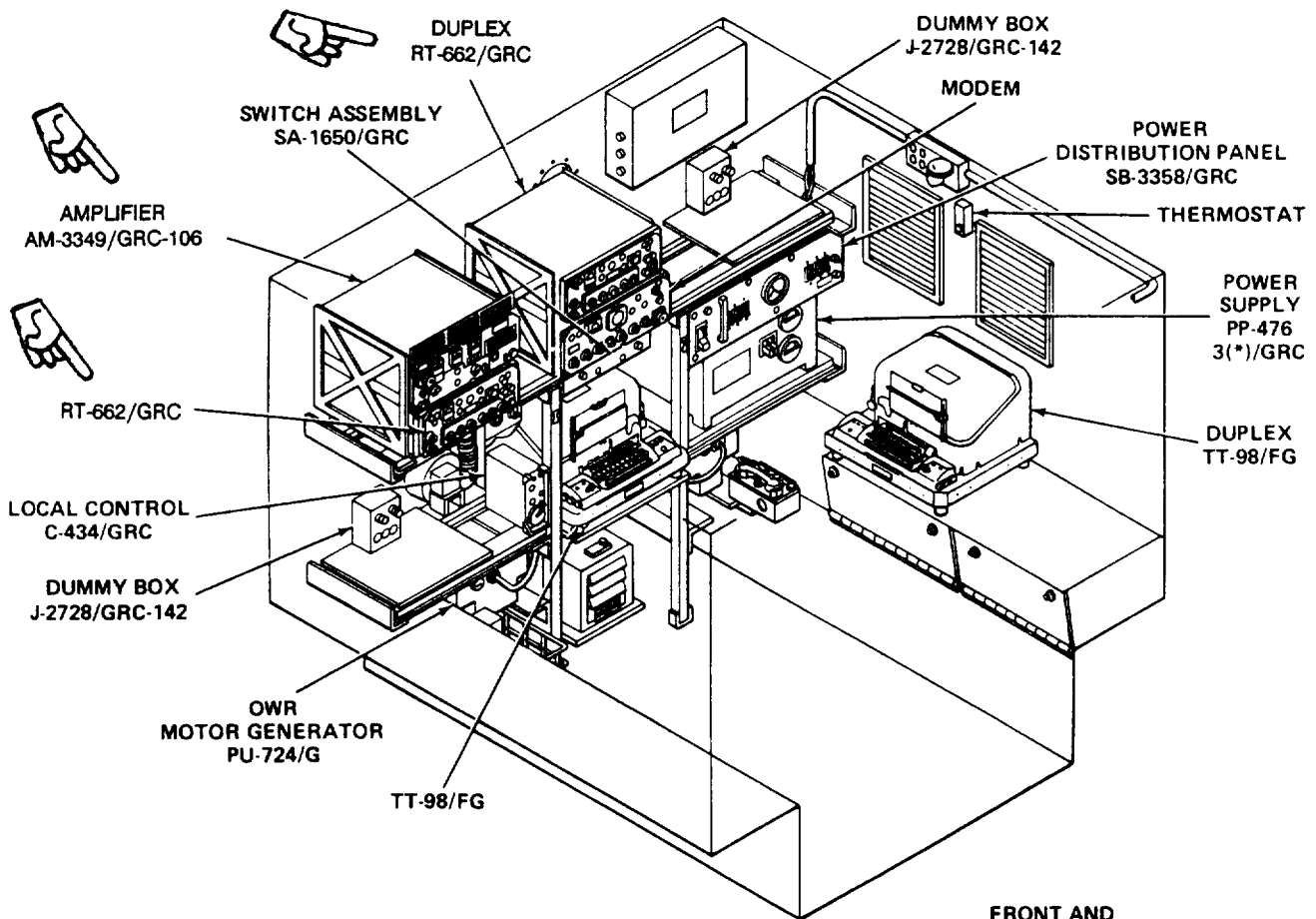
This manual covers twelve different models. Applicable model numbers will be listed in paragraph titles. If paragraphs are applicable to all models of the equipment, an asterisk (\*) will follow the model number,

TOP



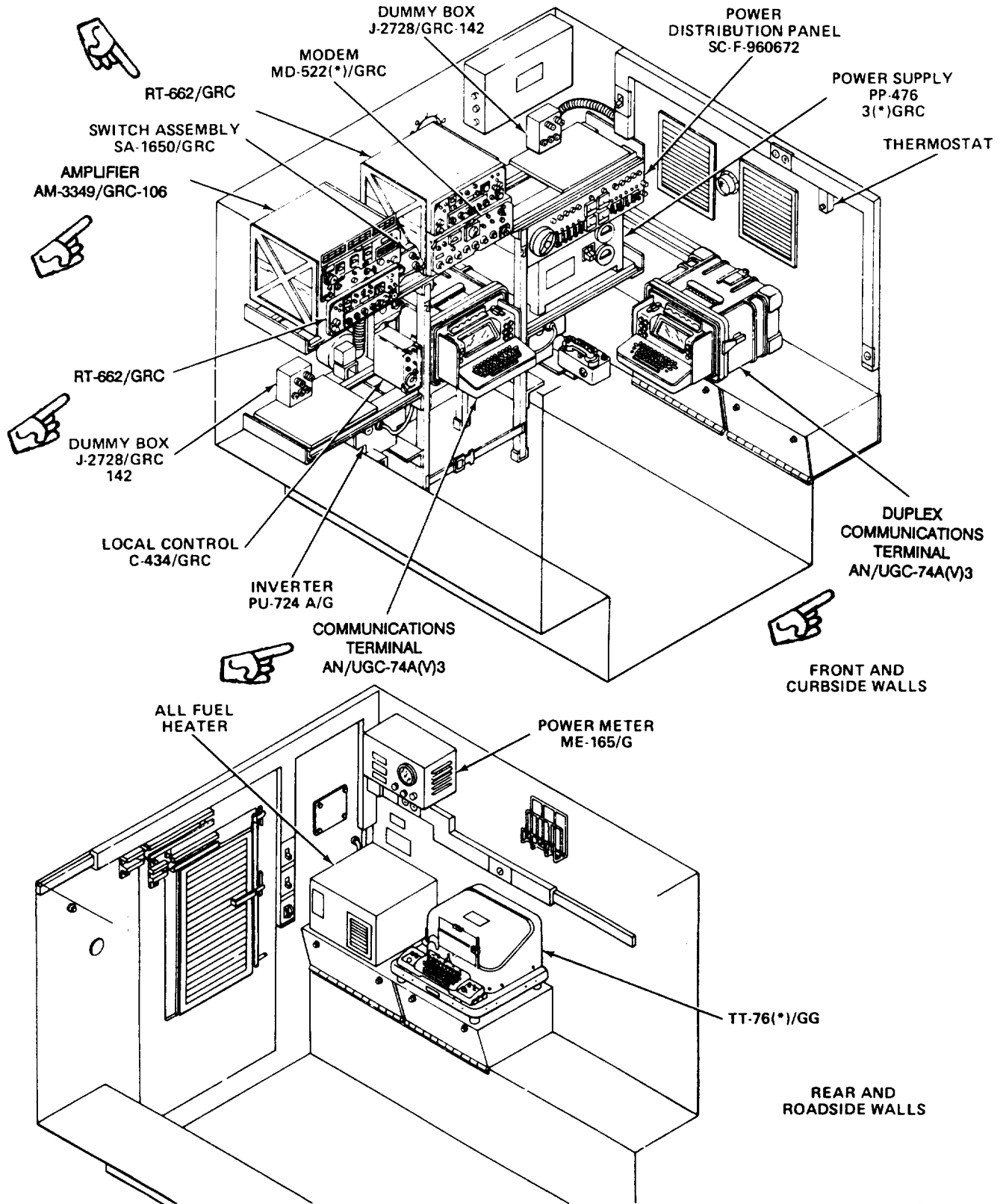
Radio Teletypewriter Sets AN/GRC-122/142 Plain and C Models

EL6VT002



EL6VT003

Radio Teletypewriter Sets AN/GRC-122/142A and B Models



EL6VT004

Radio Teletypewriter Sets AN/GRC-122/142D and E Models



# CHAPTER 1

## INTRODUCTION

Subject	Section	Page
General Information .....	I	1-1
Equipment Description and Data .....	II	1-3
Principles of Operation .....	III	1-7

### OVERVIEW

This chapter will familiarize you with Radio Teletypewriter Sets AN/GRC-122/142(\*). It contains general information about the equipment, references to pertinent forms and publications, equipment specifications, and principles of operation.

### Section I GENERAL INFORMATION

Subject	Para	Page
Scope .....	1-1	1-1
Consolidated Index of Army Publications and Blank Forms .....	1-2	1-2
Maintenance Forms, Records, and Reports .....	1-3	1-2
Reporting Equipment Improvement Recommendations (EAR) .....	1-4	1-2
Destruction of Army Electronics Materiel to Prevent Enemy Use .....	1-5	1-2
Administrative Storage .....	1-6	1-2
Nomenclature Cross-Reference List .....	1-7	1-3

#### 1-1. SCOPE.

Type of Manual: Direct support and general support maintenance manual.

Equipment Name and Model Number. The twelve pieces of equipment described in this manual are radio teletypewriter sets. There are two basic configurations. They are AN/GRC-122, which can be configured as AN/GRC-122A, AN/GRC-122B, AN/GRC-122C, AN/GRC-122D or AN/GRC-122E, and AN/GRC-142, which can be configured as AN/GRC-142A, AN/GRC-142B, AN/GRC-142C, AN/GRC-142D or AN/GRC-142E. The asterisk (\*) following AN/GRC-122(\*) or AN/GRC-142(\*) indicates all models of that configuration. An asterisk (\*) following AN/GRC-122/142(\*) indicates all twelve models.

Purpose of Equipment: Provides front-line secure or nonsecure radio or teletypewriter one-way reversible (AN/GRC-142(\*)) or simultaneous transmission and reception (AN/GRC-122(\*)) communications system. The communications system is housed in a mobile, all-weather front-line shelter.

## 1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, 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 and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update.

*b. Reporting of item and Packaging Discrepancies.* Fill out and forward SF 384 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

*c. Transportation Discrepancy Report (TDR) (SF 361).* Fill out and forward Transportation Discrepancy Report (TDR) (SF 381) as prescribed in AR 55-38/NAVSUPINST 4810.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

## 1-4. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

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

## 1-5. ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities will have Preventive Maintenance Checks and Services (PMCS) performed before storing. When removing the equipment from administrative storage, the PMCS checks should be performed to assure operational readiness.

## 1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your equipment 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 or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ED-CFO, Fort Monmouth, New Jersey 07703-5023. We'll send you a reply.

## 1-7. NOMENCLATURE CROSS-REFERENCE LIST.

COMMON NAME	OFFICIAL NOMENCLATURE
amplifier	Amplifier Radio Frequency AM-3349/GRC-106
AN/UGC-74 A(V)3 or AN/UGC-74 B(V)3	Terminals, Communications AN/UGC-74A(V)3 and AN/VGC-74B(V)3
control group	Control Group, AN/GRA-6
control panel	Switch Assembly SA-1554/GRC-142
doublet antenna	Antenna Group, AN/GRA-50
dummy box	Interconnecting box J-2728/GRC-142
duplex RT-662/GRC	Duplex Receiver-Transmitter, Radio RT-662/GRC
handset	Handset H-33(*)PT
headset	Headset, Electrical H-227/H
local control	Local Control C434/GRC
loudspeaker	Dynamic Loudspeaker LS-166/U
<b>microphone</b>	Microphone M-29B/U
modem	Modem MD-522(*)/GRC
power meter	Standing Wave Ratio Power Meter ME-185/GRC
power supply	Power supply PP-4783(*)/GRC
radio set	Radio Set AN/GRC-106
remote box	Remote Control Box C-7279/GRC-142
remote control	Remote Control C-433/GRC
shelter	Shelter, Electrical Equipment S-250/G or S318(*)/G
switch assembly	Switch Assembly SA-1650/GRC
switch box	Switch Box SA-1555/GRC-142

**1-7. NOMENCLATURE CROSS-REFERENCE LIST. (CONT)**

COMMON NAME	OFFICIAL NOMENCLATURE
telegraph key	Key, Telegraph KY-116/U
telephone	Telephone Set TA-312/PT
TT-76(*)/GGC	Teletypewriter Reperforator/Transmitter TT-76(*)/GGC
TT-98/FG	Teletypewriter TT-98/FG
voltmeter	Voltmeter, ME-345/GRC
whip antenna	Whip Antenna consisting of: Mast Base AB-852/GR Mast Section MS-116A Mast Section MS-117A Mast Section MS-118A

**Section II EQUIPMENT DESCRIPTION AND DATA**

Subject	Para	Page
General .....	1-8	1-4
Equipment Characteristics, Capabilities, and Features .....	1-9	1-4
Location and Description of Major Components .....	1-10	1-5
Differences Between Models .....	1-11	1-5
Equipment Data .....	1-12	1-6
Safety, Care, and Handling .....	1-13	1-6

**1-8. GENERAL.**

This section contains over all information about Radio Teletypewriter Sets AN/GRC-122/142(\*). It includes references to publications that provide detailed equipment description and data; coverage of major differences between models, and a summary of warnings, cautions, and general handling procedures.

**1.9. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.**

For information refer to TM 11-5815-334-10.

**1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.**

Refer to TM 11-5815-334-10.

**1-11. DIFFERENCES BETWEEN MODELS.**

The radio teletypewriter (tty) sets differ in shelter models, internal components, and configuration. The following table indicates differences between all twelve models. Items common to all models are not listed.

	AN/GRC-122					AN/GRC-142						
	P*	A	B	C	D	E	P*	A	B	C	D	E
Shelter Electrical Equipment S-250/G			x			x			x			
Shelter Electrical Equipment S-318(*)/G	x	x		x	x		x	x		x	x	
Duplex RT-662/GRC	x	x	x	x	x	x						
Teletypewriter TT-98/FG	x	x	x				x	x	x			
Teletypewriter TT-98/FG (duplex)	x	x	x	x	x	x						
Terminal, Communications AN/UGC-74A(V)3				x	x	x				x	x	
Motor-Generator PU-724/G	x	x	x	x			x	x	x	x		
Motor-Generator PU-724/G (duplex)	x	x	x	x								
Inverter PU-724 A/G					x	x					x	
Inverter PU-724 A/G (duplex)					x	x						
Air Conditioner (serial numbers 1-1679 only)							x					
Switch Assembly SA-1554/GRC-142	x			x			x			x		
Switch Assembly SA-1650/GRC		x	x		x	x		x	x		x	
Switch Box SA-1555/GRC-142	x			x			x			x		
Power Terminal Assembly		x	x		x	x		x	x		x	
Distribution Box J-2776/GRC-142	x			x			x			x		
Power Distribution Box SB-3018/GRC	x			x			x			x		
Power Distribution Box SB-3358/GRC		x	x					x	x			
Power Distribution Box SC-F-960672					x	x					x	
Ac Entrance Box (front)	x			x			x			x		
Dc Entrance Box (rear)	x			x			x			x		
Ac Voltmeter	x			x			x			x		
Power Signal Entrance Box		x	x		x	x		x	x		x	
Headset, Electrical H-227/U (duplex)	x	x	x	x	x	x						
Teletypewriter TT-98/FG Slide Mount	x						x					
Teletypewriter Reperforator/Transmitter TT-76A/GGC Slide Mount	x			x			x			x		
Teletypewriter TT-98/FG (duplex) Slide Mount	x						x					
Mounting MT-3140/GRC-106	x	x	x	x	x	x						
Fluorescent Lighting					x	x					x	

\* P indicates Plain model.

**CAUTION**

Inverter PU-724A/G to be used with authorized equipment only. Do not exceed 400 watts. Overheating of inverter could cause fracture of solid state components.

**1-12. EQUIPMENT DATA.**

The following publications cover AN/G RC-122/142(\*) equipment data:

TM 11-5815-334-10

TM 11-5815-334-20

**1-13. SAFETY, CARE, AND HANDLING.**

Be sure to follow all Warnings, Cautions, and Notes in this manual. Learn all the Warnings located in initial pages before attempting to perform any maintenance tasks. Failure to observe the Warnings, Cautions, and Notes could result in death or injury to personnel, damage to equipment, or both.

**WARNING**

High voltage is used with this equipment. Death on contact may result if safety precautions are not observed.

Remove all rings, watches, and jewelry before turning power on.

Make certain you are not grounded when working inside the equipment with power turned on. Do not attempt internal service or adjustment unless another person is present who is capable of rendering first aid and resuscitation. A periodic review of safety precautions in TB 385-4, Safety Precautions for Maintenance of Electrical/Electronic Equipment, is recommended.

Fumes of TRICHLOROTRIFLUOROETHANE are poisonous. Provide adequate ventilation whenever you use TRICHLOROTRIFLUOROETHANE. Do not use solvent near heat or open flame. TRICHLOROTRIFLUOROETHANE will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. TRICHLOROTRIFLUOROETHANE dissolves natural skin oils. DO NOT get the solvent on your skin. Use gloves, sleeves, and an apron which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

### Section III PRINCIPLES OF OPERATION

Subject	Para	Page
General .....	1-14	1-7
System Capabilities .....	1-15	1-7
Telephone and CW Circuits Analysis, AN/GRC-122/142 Plain and C Models .....	1-16	1-8
Voice Circuit Analysis, AN/GRC-122/142 Plain and C Models .....	1-17	1-10
Telephone and CW Circuits Analysis, AN/GRC-122/142A, B, D, and E Models .....	1-18	1-13
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Teletypewriter Loop Circuit (Typical) .....	1-20	1-19
Local OWR/Duplex Teletypewriter Send and Receive Circuits, AN/G RC-122/142 Plain and C Models .....	1-21	1-20
Local OWR/Duplex Teletypewriter Send and Receive Circuits, AN/GRC-122/142A, B, D, and E Models .....	1-22	1-23
AC and DC Power Distribution, AN/GRC-122/142 Plain and C Models .....	1-23	1-26
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AC and DC Power Distribution, AN/GRC-122/142D and E Models .....	1-26	1-32

#### 1-14. GENERAL.

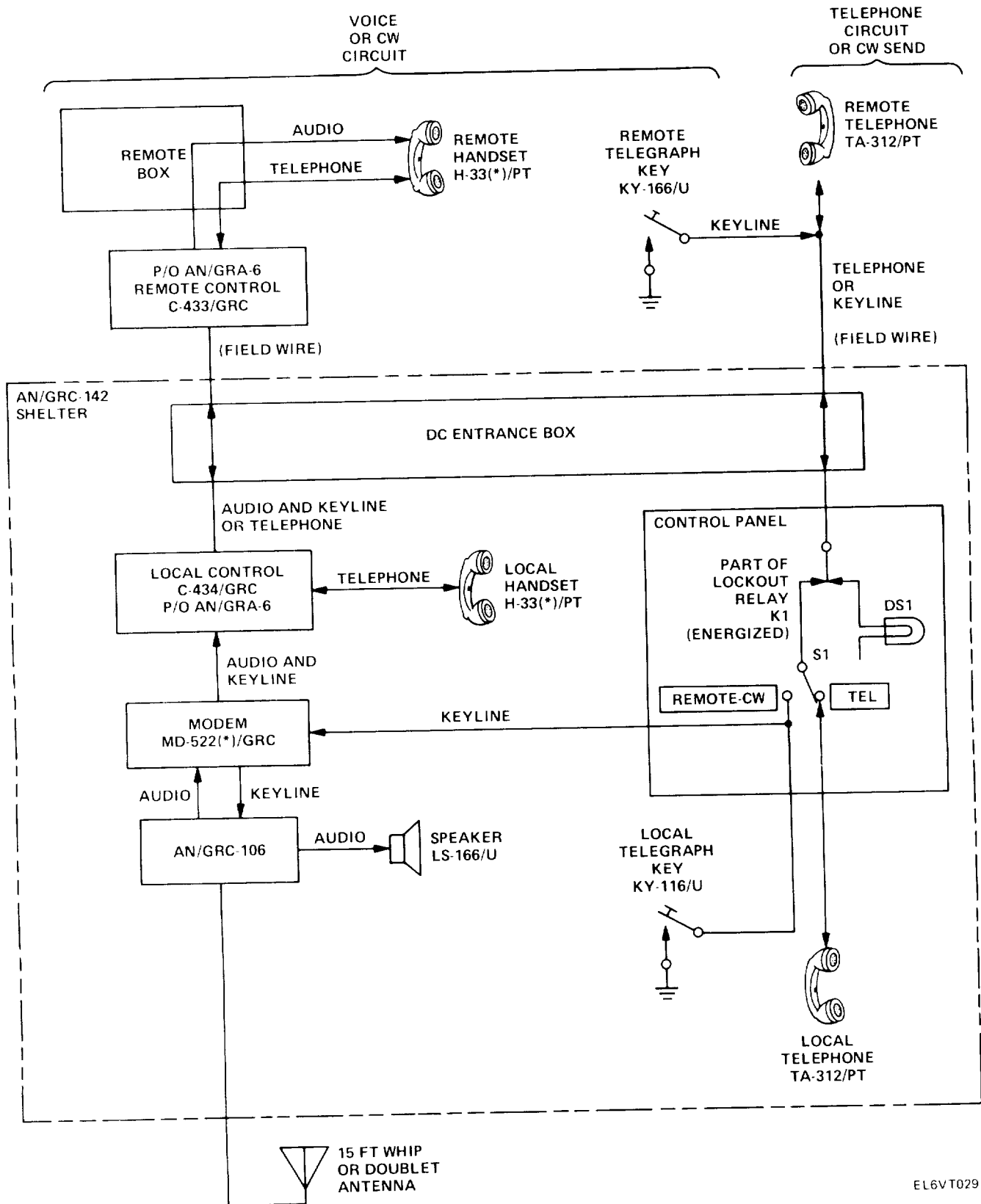
This section contains a brief description of the signal and power paths that exist in AN/GRC-122/142(\*). The block diagrams that accompany text are provided to aid you in gaining a general understanding of these circuits. For details regarding power distribution and signal flow, see the wiring diagrams at the rear of manual.

#### 1-15. SYSTEM CAPABILITIES.

Radio Teletypewriter Sets AN/GRC-122/142(\*) are capable of ovr local or remote teletypewriter transmission. In addition to teletypewriter transmission, these systems are capable of transmitting and receiving ssb, compatible am, and cw signals.

With the addition of AN/UGC-74A(V)3 or TT-98/FG, RT-662/GRC, antenna, inverter, and various accessory items to the AN/GRC-142(\*) system is capable of dx operations and systems are redesignated AN/GRC-122(\*). Dx operation allows simultaneous transmission and reception. Items used with dx or pony configurations are supplied as part of AN/GRC-122(\*) only. AN/GRC-142(\*)'s are prewired for conversion to AN/GRC-122(\*) configuration.

1-16. TELEPHONE AND CW CIRCUITS ANALYSIS, AN/GRC-122/142 PLAIN AND C MODELS.



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**1-16. TELEPHONE AND CW CIRCUITS ANALYSIS, AN/GRC-1221142 PLAIN AND C MODELS. (CONT)****PRIMARY TELEPHONE CIRCUIT**

Two different circuits are available for establishing telephone communications between local and remote operators. The primary circuit utilizes two Telephone Sets TA-312/PT interconnected by field wires that enter or exit shelter at DC ENTRANCE BOX. Lightning arresters and high frequency filters inside entrance box protect equipment and eliminate high frequency signals and noise. The signal path through the control panel is controlled by lockout relay K1. The purpose of K1 is to break telephone communications between remote site and shelter when special security equipment is installed. Relay K1 is controlled by interlock switches S1 and S2 and is automatically deenergized when security equipment is installed in place of dummy boxes. LOCKOUT-OVERRIDE switch on control panel can be utilized to override K1 and disable this feature. The field wire circuit just described is also used to carry cw signals during remote cw operation. For this reason, the secondary telephone circuit must be established if simultaneous telephone communications are required during remote cw operation.

**SECONDARY TELEPHONE CIRCUIT**

The secondary telephone circuit is made up of two handsets H-33/PT, interconnected through local and remote control units that together comprise Control Group AN/GRA-6. Like the primary circuit, field wires associated with secondary circuit are routed through lightning arresters and high frequency filters in DC ENTRANCE box. The use of remote box, connected between remote control and handset, is optional when operating in telephone or voice transmission mode.

**LOCAL CW OPERATION**

During local cw operations, cw control (ground) signals are originated at Telegraph Key KY-116/U. These signals are routed directly through control panel, from J2 to J1, and out to modem. From connector J2 in modem, signal is applied to keying circuit of radio set. When transmitting from a whip antenna, rf signals are applied directly to whip. When a doublet antenna is used, rf signals generated in radio set are routed first through power meter. From power meter, signal is applied to doublet antenna for transmission.

During cw operations, incoming rf signals are converted into audio tone by radio set. This tone, in the form of a 10 mw signal, is applied through modem to J1 on control panel. From control panel connector J2, signal is directed to earphone of handset. This signal is also applied to SPEAKER REMOTE connector J4 on modem for monitoring on an optionally installed loudspeaker.

**1-16. TELEPHONE AND CW CIRCUITS ANALYSIS, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)**

REMOTE CW OPERATION

During remote operations, cw control (ground) signals are originated at remote telegraph key and transmitted over the same field wire pair associated with primary telephone circuit. Like telephone transmissions, cw signals follow a path through control box to lockout relay K1. If lockout relay is deenergized, remote telegraph key will be disabled. From relay, signal is applied to TEL-REMOTE CW switch, S1. When set to REMOTE CW position, switch S1 applies signal to output connector J1 on control panel.

During remote operations, incoming signals follow the same path as during local operations until signal reaches control panel. At that point, signal exits control panel at connector J3 and is fed through to Local Control C-434/GRC. From local control, signal is fed to DC ENTRANCE BOX where it passes through high frequency filters and lightning arresters. When the signal exits the entrance box, it is carried on a field wire pair to Remote Control C-433/GRC. The signal exits remote control at J1 and is routed through remote box to J13 where it is applied to handset earphone.

**1-17. VOICE CIRCUIT ANALYSIS, AN/GRC-122/142 PLAIN AND C MODELS.**

LOCAL VOICE OPERATION

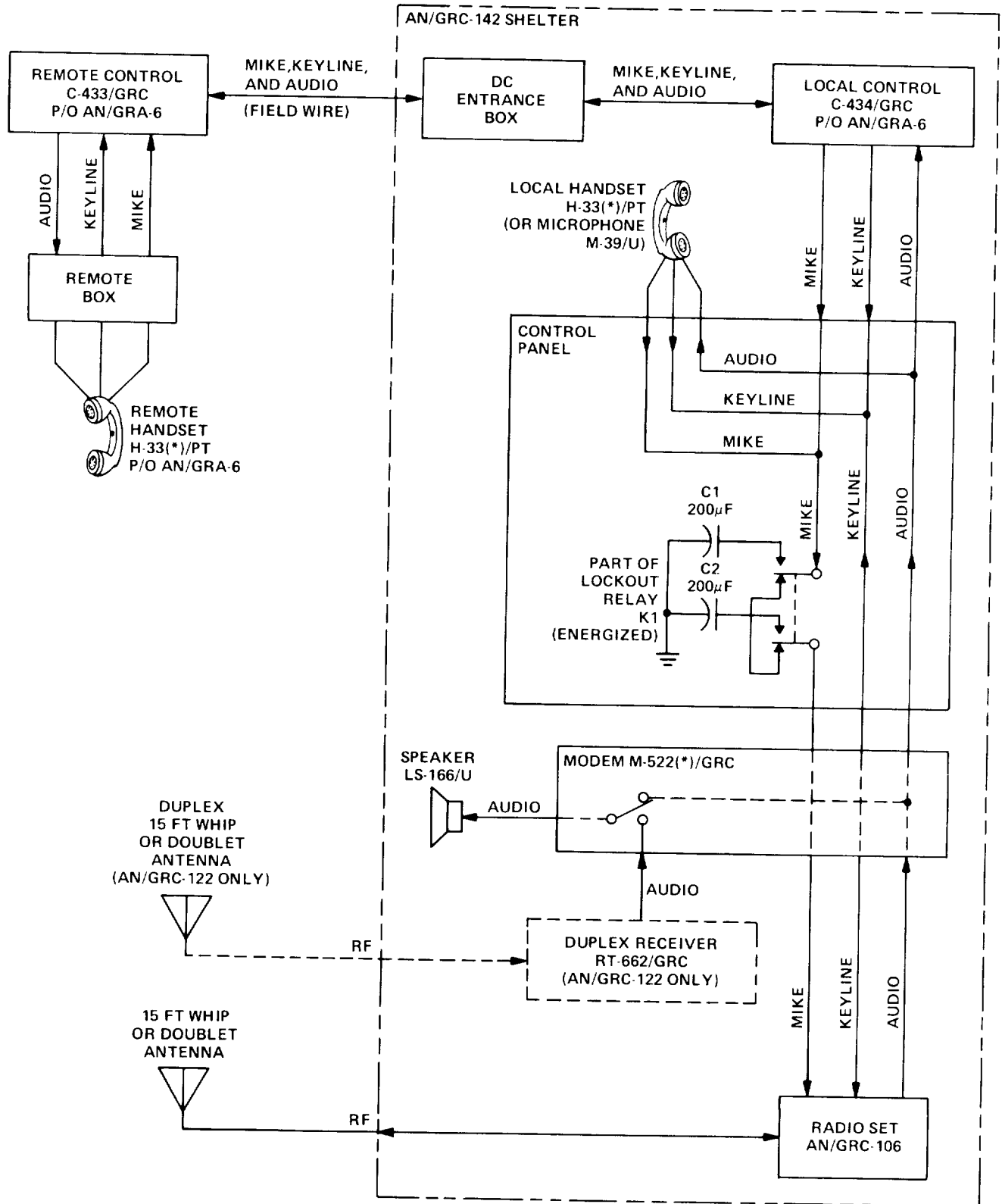
Local Keying

The push-to-talk switch in handset controls keying circuit of radio set. When switch is closed, a continuous circuit is established between handset, control panel, modem, and AUDIO connector on radio set. This condition results in radio set keying.

Local Voice Communication

Voice transmissions are generated within handset and pass through contacts of push-to-talk switch into control panel connector J2. Inside control panel, signal passes through lockout relay K1. If K1 is deenergized because security equipment is installed, signal is grounded and transmission disabled. If K1 is energized, signal exits control panel through J1 and is applied to MICROPHONE connector J3 on modem. The signal travels through modem and exits at J2. Connector J2 is connected to AUDIO connector of radio set. The signal enters radio set and is applied to modulator section. Simultaneous with transmission of voice signal, microphone return path is applied to ground at connector J1.

1-17. VOICE CIRCUIT ANALYSIS, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)



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**1-17. VOICE CIRCUIT ANALYSIS, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)**

LOCAL VOICE OPERATION (CONT)

Output from modulator section of radio set is used to modulate rf output. The resulting modulated rf signal is fed to a 15 foot whip antenna, or alternately through a standing wave ratio power meter to a doublet antenna, for transmission.

Incoming signals are converted to voice frequencies by radio set and then follow the same path as incoming cw signals. (See Local CW Operations.)

REMOTE VOICE OPERATION

Remote Keying

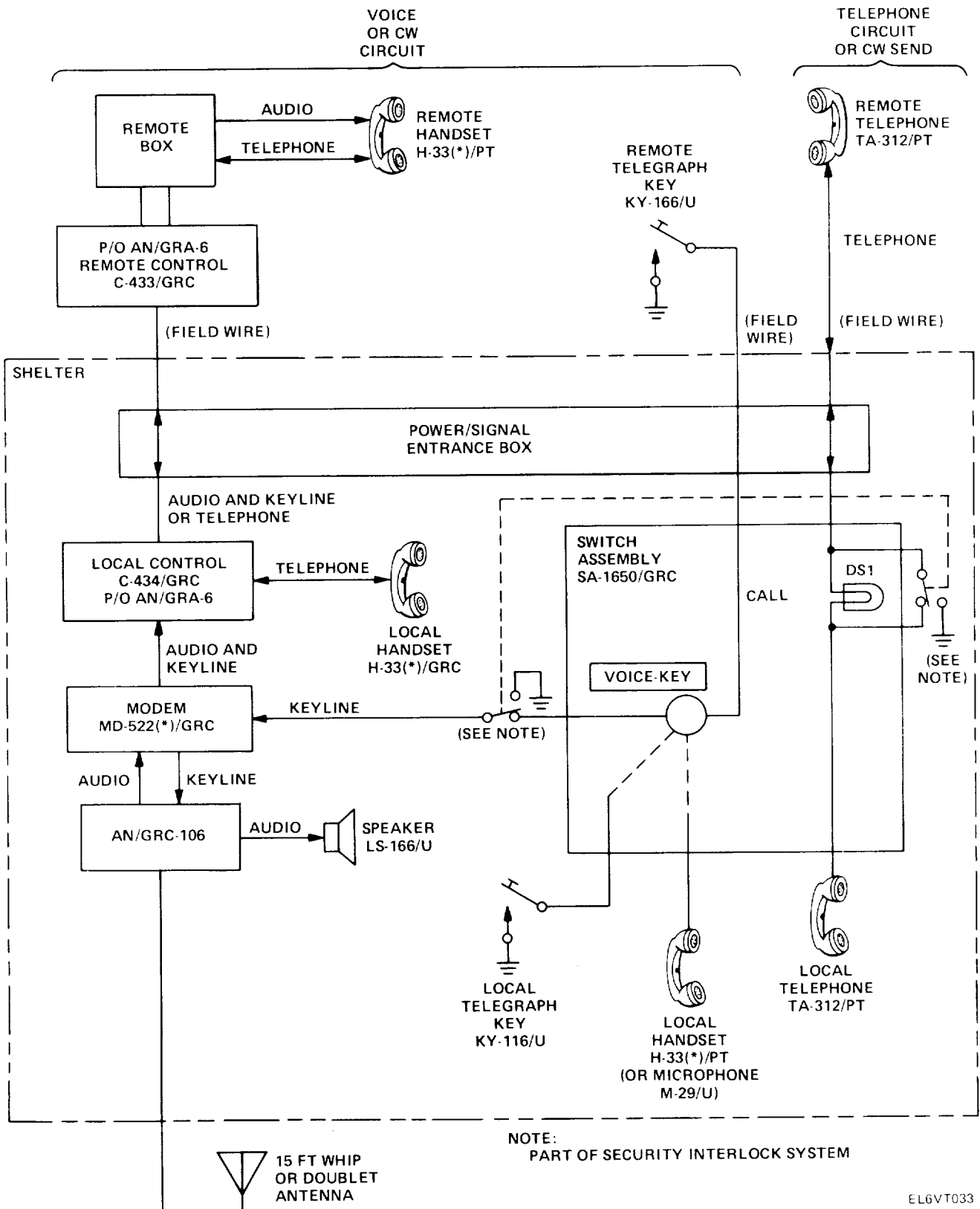
The push-to-talk switch in handset controls keying circuit of radio set. In remote operation, handset is connected to control panel through remote box and the remote and local control units that together comprise Control Group AN/G RA-6. When push-to-talk switch is closed, closed circuit is continued through J13 into remote box. Signal exits remote box into remote control through AUDIO receptacle J1. When closed circuit is detected by remote control, a keying circuit within remote control unit places a dc voltage across binding posts L1 and L2. Field wires connect remote control to shelter. These wires enter shelter through DC ENTRANCE BOX where lightning arresters are provided to protect equipment. High frequency filters on each wire eliminate high frequency signals and noise. The field wires exit DC ENTRANCE BOX and are connected to the local control. When local control detects dc voltage applied to field wire pair by the remote control, internal circuitry applies keyline to ground. The grounded keyline circuit is continued to control panel through J3. From this point, remote keying circuit follows the same path as local keying circuit.

Remote Voice Communication

Voice transmissions are generated within handset and pass through contacts of push-to-talk switch into remote box through connector J13. Signal exits remote box and enters remote control through AUDIO connector J1. A field wire pair connects remote control to shelter DC ENTRANCE BOX. Inside box, lightning arresters are installed to protect equipment and filters on each line to eliminate high frequency signals and noise. The field wires exit entrance box and are connected to local control binding posts. Signal passes through local control and enters control panel at connector J3. From this point, remote voice transmissions follow same path as local voice transmissions.

Incoming signals are converted to voice frequencies by radio set and then follow same path as incoming cw signals. (See Remote CW Operation, para 1-16.)

1-18. TELEPHONE AND CW CIRCUITS ANALYSIS, AN/GRC-122/142A, B, D, AND E MODELS.



**1-18. TELEPHONE AND CW CIRCUITS ANALYSIS, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)**

**PRIMARY TELEPHONE CIRCUIT**

Two different circuits are available for establishing telephone communications between local and remote operators. The primary telephone circuit is made up of two Telephone Sets TA-312/PT interconnected by field wires that enter or exit shelter at POWER/SIGNAL ENTRANCE BOX. Lightning arresters and high frequency filters inside entrance box protect equipment and eliminate high frequency signals and noise. The signal is fed from entrance box to connector J17 on switch assembly. Switch assembly CALL lamp DS1 is interconnected with the signal path. DS1 functions as an indicator when the primary telephone circuit is operated while security equipment is installed in shelter. From switch assembly, signal is fed through interlock switches S1 and S2, located outside switch assembly on equipment racks, and then through LOCKOUT-OVERRIDE switch S5. The signal is then delivered to a local telephone via terminals E1 and E2. When interlock switches are engaged due to installation of security equipment, telephone circuit is disabled. Activation of LOCKOUT-OVERRIDE switch temporarily restores telephone communications.

**SECONDARY TELEPHONE CIRCUIT**

The secondary telephone circuit is normally used during remote cw operations when the primary circuit is disabled. The secondary telephone circuit is made up of two Handsets H-33/PT interconnected through the local and remote control units that together comprise Control Group AN/GRA-6. In addition, an optional remote box may be interconnected, as described below, between the remote telephone and remote control.

A telephone signal generated in remote handset is applied to remote box through connector J13. The signal exits remote box and enters remote control through AUDIO connector J1. The signal is then output from remote control to a field wire pair connected to binding posts L1 and L2. The field wires carry signal to shelter where it is fed through POWER/SIGNAL ENTRANCE BOX. Inside entrance box are lightning arresters to protect equipment and filters to eliminate high frequency signals and noise. Exiting POWER/SIGNAL ENTRANCE BOX, signal is applied to binding posts on local control. Signal path is completed when signal exits local control through J1 and is applied to handset.

**1-18. TELEPHONE AND CW CIRCUITS ANALYSIS, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)****LOCAL CW OPERATION**

During local cw operations, cw control (ground) signals are originated at Telegraph Key KY-116/U. These signals are routed directly through switch assembly from J12 to J11 and out to modem. From connector J2 in modem, signals are applied to keying circuit of radio set. When transmitting from a whip antenna, rf signals are applied directly to whip. When a doublet antenna is used, rf signals generated in radio set are routed first through power meter. From power meter, signal is applied to doublet antenna for transmission.

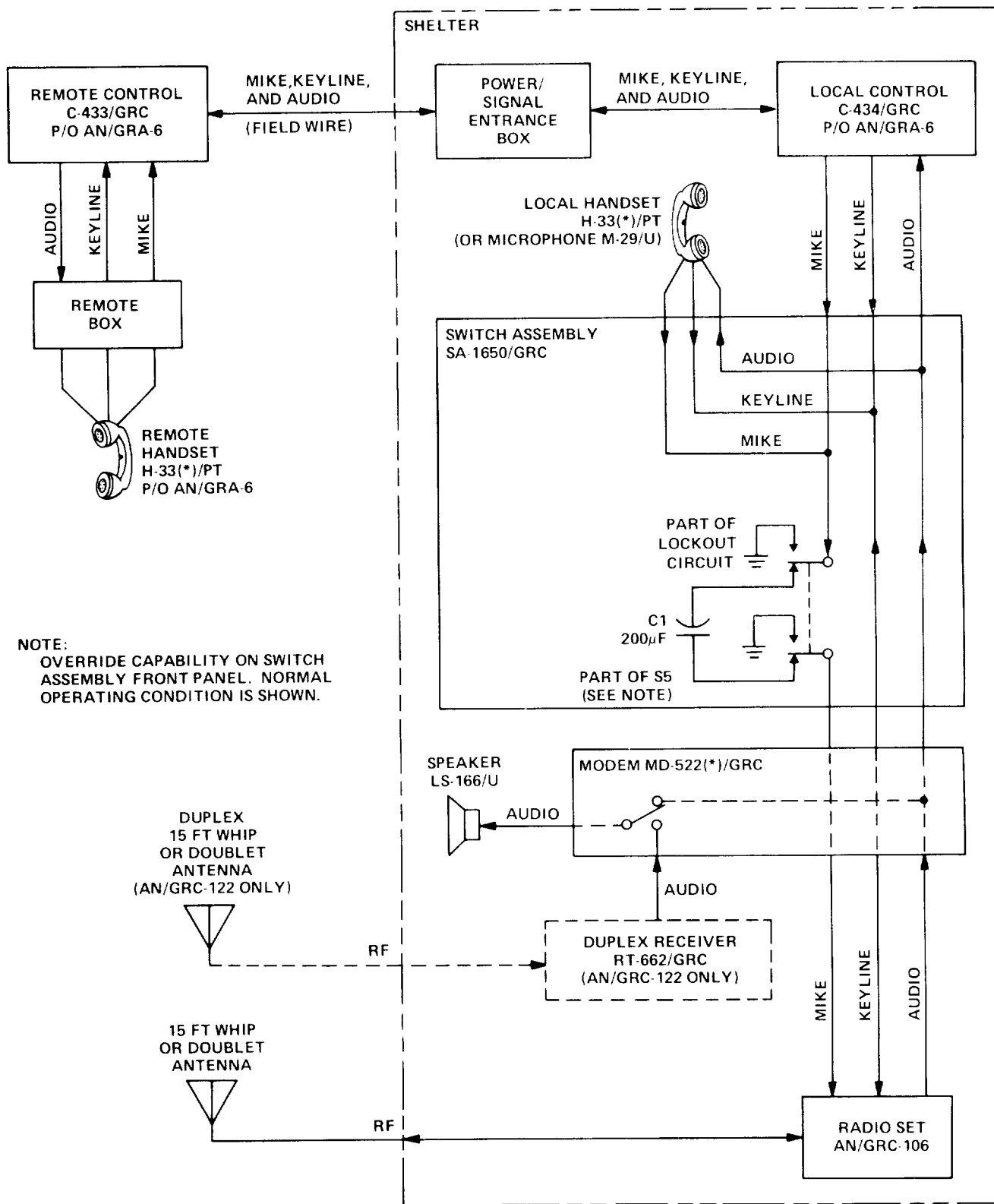
During cw operations, incoming rf signals are converted into audio tone by radio set. This tone, in the form of a 10 mw signal, is applied through modem to J11 of switch assembly. From switch assembly connector J12, signal is directed to earphone of local handset. This signal is also applied to SPEAKER REMOTE connector J4 on modem for monitoring on an optionally installed loudspeaker.

**REMOTE CW OPERATION**

During remote operations, cw control (ground) signals are originated at remote telegraph key. The signals are carried on a field wire pair and enter shelter via REM cw terminals in POWER/SIGNAL ENTRANCE BOX. Inside entrance box are lightning arresters to protect equipment and filters on each line to eliminate high frequency signals and noise. Signals exit POWER/SIGNAL ENTRANCE BOX on cable SM-C-613236. When this cable is connected to VOICE-KEY connector on switch assembly, remainder of signal path is identical to local cw signal path.

During remote operation, incoming signals follow the same path as during local operation until signal reaches switch assembly receptacle J11. The remote signals exit switch assembly at J13 and are applied to local control. Output of local control is routed through POWER/SIGNAL ENTRANCE BOX to an external field wire pair. Lightning arresters and filters inside entrance box protect equipment and eliminate high-frequency signals and noise. The signals are carried on a field wire pair to remote control. The signal exits remote control at J1 and is routed through remote box to J13 where it is applied to handset earphone.

1-19. VOICE CIRCUIT ANALYSIS, AN/GRC-122/142A, B, D, AND E MODELS.



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## 1-19. VOICE CIRCUIT ANALYSIS, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)

### LOCAL VOICE OPERATION

#### Local Keying

The push-to-talk switch in the Handset H-33/PT controls keying circuit of radio set. When switch is closed, a continuous circuit is established between handset, switch assembly, modem, and AUDIO connector on radio set. This condition results in radio set keying.

#### Local Voice Communication

Voice transmissions are generated within handset and pass through contacts of push-to-talk switch into switch assembly connector J12. When security equipment is installed, interlock switch S1 will ground microphone signal to prevent voice transmission. Activation of LOCKOUT-OVERRIDE switch S5 will prevent grounding of signal when interlock switches are engaged. If it has not been grounded, signal exits switch assembly at J11. From here signal is applied to MICROPHONE connector J3 on modem. The signal travels through modem and exits at J2. Connector J2 is connected to AUDIO receptacle of radio set. At this point, the microphone return circuit is completed when it is applied to ground at radio set AUDIO connector. This return circuit is completed back through the modem to switch assembly connector J12. The signal enters the radio set and is applied to the modulator section. Output from this section is used to modulate rf signal from radio. The resulting modulated rf signal is fed to a 15 foot whip antenna for transmission. Alternately, the signal may be fed through standing wave ratio power meter to a doublet antenna for transmission.

Incoming signals are converted to voice frequencies by radio set and then follow same path as incoming cw signals. (See Remote CW Operation, para 1-16.)

### REMOTE VOICE OPERATION

#### Remote Keying

The push-to-talk switch in handset controls keying circuit of radio set. In remote operation, handset is connected to switch assembly through remote box and the remote and local control units that together comprise Control Group AN/GRA-6. When push-to-talk switch is closed, closed circuit is continued through J13 into remote box. Signal exits remote box into remote control through AUDIO connector J1. When closed circuit is detected by remote control, a keying circuit within remote control unit places a dc voltage across binding posts L1 and L2.

**1-19. VOICE CIRCUIT ANALYSIS, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)**

REMOTE VOICE OPERATION (CONT)

Field wires connect remote control to the shelter. These wires enter shelter through POWER/SIGNAL ENTRANCE BOX where lightning arresters are provided to protect equipment. High frequency filters on each wire eliminate high frequency signals and noise. The field wires exit POWER/SIGNAL ENTRANCE BOX and are connected to local control. When local control detects dc voltage applied to field wire pair by remote control, internal circuitry applies keyline to ground. The grounded keyline circuit is continued to switch assembly through J13. From this point, remote keying circuit follows same path as local keying circuit.

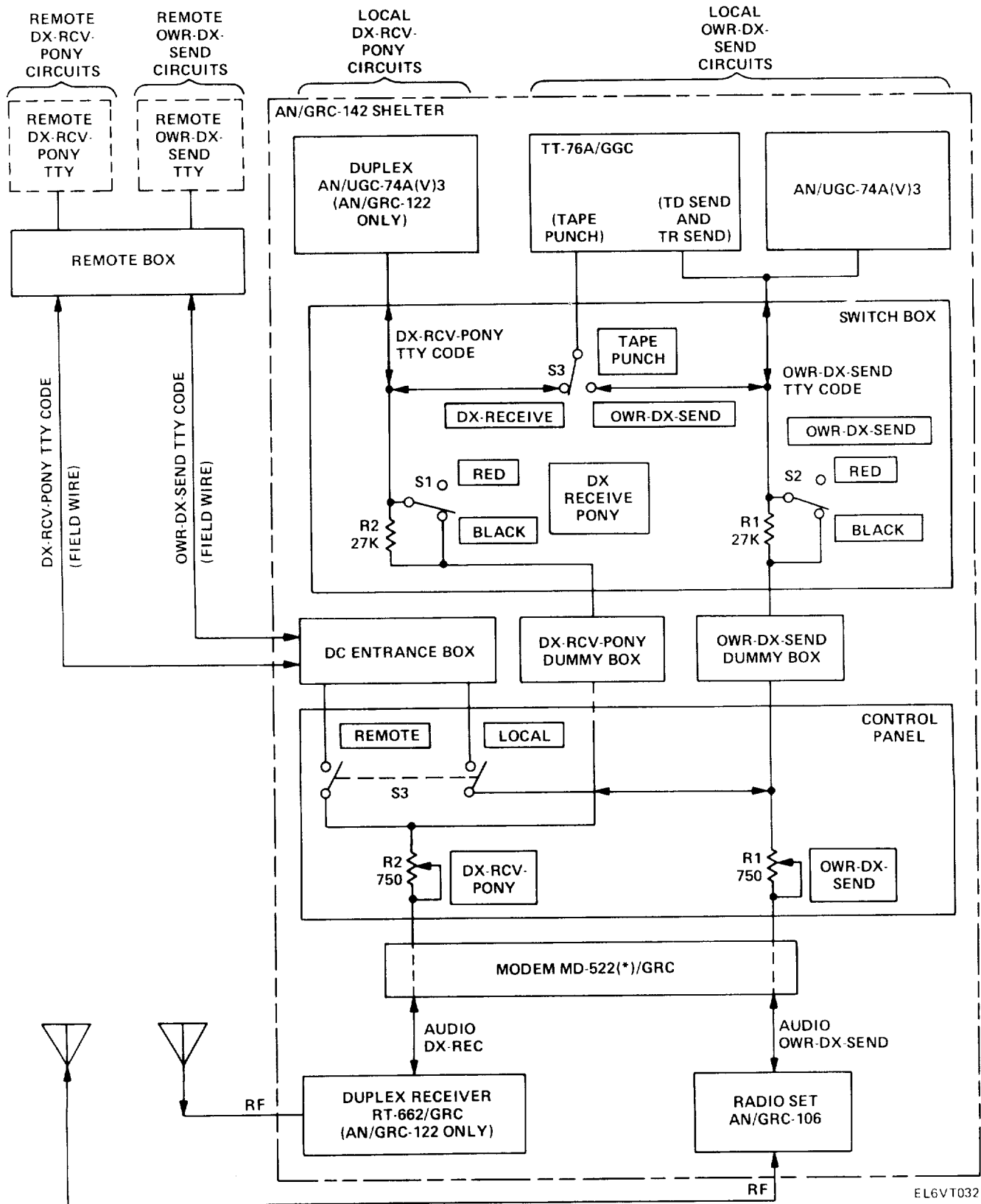
Remote Voice Communication

Voice transmissions are generated within handset and pass through contacts of push-to-talk switch into remote box through connector J13. Signal exits remote box and enters remote control through AUDIO connector J1. A field wire pair connects remote control to shelter POWER/SIGNAL ENTRANCE box. Inside box, lightning arresters are installed to protect equipment and filters on each line eliminate high frequency signals and noise. The field wires exit entrance box and are connected to local control binding posts. Signal passes through local control and enters switch assembly at connector J13. From this point, remote voice transmissions follow same path as local voice transmissions.

Incoming signals are converted to voice frequencies by radio set and then follow the same path as incoming cw signals. (See Remote CW Operation, para 1-16.)



1-21. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142 PLAIN AND C MODELS.



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## 1-21. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)

### LOCAL OWR/DUPLEX SEND CIRCUIT

Loop current is present at DC LOOP NO. 1 DX SEND/OWR connector J6 of modem whenever modem is energized. The loop current follows path described below.

Loop current exits J6 and enters control panel at J5. Inside control panel, current passes through variable resistor R1 controlled by OWR-DX-SEND control. Activation of this control alters circuit resistance to adjust loop current at tip of J9. If no external connection is made to J9, its tip and ring remain internally shorted. This internal short provides a path for the current through LOCAL-REMOTE switch S3 back to modem to complete circuit. In this condition, steady loop current (mark hold signal) exists in modem. This path exists only when S3 is in LOCAL position,

When connection is made to J9, loop current flows from tip through dummy box and is applied to switch box connector J10. The current completes a loop through page printer selector magnet of front TT-98/FG or AN/UGC-74A(V)3 via connector J7. From J7, current is applied to TAPE PUNCH switch S3. When S3 is set to OWR-DX-SEND position, the current completes a loop through TT-76A/GGC tape punch selector magnet coil via J8. Circuit is continued through dummy box and back to switch box where current is applied to TT-98/FG or AN/UGC-74A(V)3 keyboard contacts via J2. If S3 is set to DX-RECEIVE position, loop current bypasses TT-76A/GGC tape punch selector magnet coil and is diverted through R3. Because R3 has approximately the same resistance as TT-76A/GGC tape punch selector magnet, resistance in loop, and therefore loop current, remain the same when S3 is in either position.

From TT-98/FG or AN/UGC-74A(V)3 keyboard contacts, current completes a loop through TT-76A/GGC TD send and TR send contacts via switch box connector J1. Upon reentering switch box, current is applied to OWR-DX-SEND switch S2. The function of S2 is to enable operator to vary loop current during secure operations. When set to RED position, S2 places resistor R1 in line to decrease loop current when operating with security equipment. When set to BLACK position, S2 provides an alternate path for current around R1. In either case, current exists the switch box at J4, flows through dummy box, and enters control panel on ring side of connector J9. If LOCAL-REMOTE switch S3 is in the LOCAL position, current exits the control panel at J5. The telegraph loop is completed when current enters modem at DC LOOP NO. 1 DX SEND/OWR connector J6.

### LOCAL DUPLEX RECEIVE CIRCUIT (AN/GRC-122 ONLY)

Full duplex operation is possible only on AN/GRC-122(\*). During full duplex operations, the incoming signal is received and converted to an audio fsk signal by duplex receiver RT-662/GRC. The signal is then applied to modem through AUX-RCVR-AUDIO connector J1. The modem converts fsk signals to teletypewriter code signals by generating interruptions in loop current.

**1-21. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)**

LOCAL DUPLEX RECEIVE CIRCUIT (AN/GRC-122 ONLY) (CONT)

Loop current is present at DC LOOP NO. 2 DX-RCV-PONY connector J7 whenever modem is energized. The loop current circuit follows path described below.

The loop current exists connector J7 and enters control panel at J4. Inside control panel, current passes through variable resistor R2 which is controlled by DX-RCV-PONY control. Activation of this control alters circuit resistance to adjust loop current at tip of J8. If no connection is made to J8, its tip and ring remain internally shorted. This intentional short provides a path for the current through LOCAL-REMOTE switch S3 back to modem to complete circuit. In this condition, steady loop current in the form of mark hold signal exists in modem. This path exists only when S3 is in LOCAL position.

When connection is made to J8, loop current flows from tip through dummy box and is applied to switch box via connector J9. With TAPE PUNCH switch S3 set to DX-RECEIVE position, current exits switch box and completes a loop through TT-76A/GGC tape punch selector magnet coil via connector J8. The current then makes a loop through duplex TT-98/FG or ANWGC-74A(V)3 page printer selector magnet coil, as applicable, via switch box connector J6. When S3 is set to OWR-DX-SEND position, resistor R3 is placed in series with duplex TT-98/FG or AN/GRC-74A(V)3 page printer selector magnet coil. Because R3 has approximately the same resistance as TT-76A/GGC tape punch selector magnet, resistance in loop and therefore loop current, remain the same when S3 is in either position.

From page printer selector magnet coil, current flows through switch box, dummy box, and associated connectors until it returns to TT-98/FG or AN/G RC-74A(V)3 where it is applied to keyboard contacts. Current leaves keyboard contacts and reenters the switch box via J3. Inside switch box, current is routed to DX-RECEIVE-PONY switch S1. The function of S1 is to enable operator to vary loop current during secure operations. When set to RED position, S1 places resistor R2 in line to decrease loop current when operating with security equipment. When set to BLACK position, S1 provides an alternate path for current around R2. In either case, current exits switch box at J5, flows through dummy box, and enters control panel on ring side of connector J8. If LOCAL-REMOTE switch S3 is in the LOCAL position, current exits control panel at J4. Circuit is completed when current enters modem at DC LOOP NO. 2 DX-RCV-PONY connector J7.

**1-21. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)**

This same receive circuit may be utilized as a pony circuit between shelter and remote site. When used as a pony circuit, connection is made to circuit at control panel via DC ENTRANCE BOX and duplex TT-98/FG or AN/UGC-74A(V)3 is connected in series with remote circuit.

**REMOTE DUPLEX CIRCUIT**

When LOCAL-REMOTE switch S3 is set to REMOTE position, six jacks in the remote box are connected in series with each teletypewriter loop circuit. Unused jacks are shorted internally to maintain continuity in loop. Both send and receive circuits are connected in the same loop. This provides the operator with a simultaneous hard copy of messages transmitted from remote teletypewriters.

**1-22. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142A, B, D, AND E MODELS.**

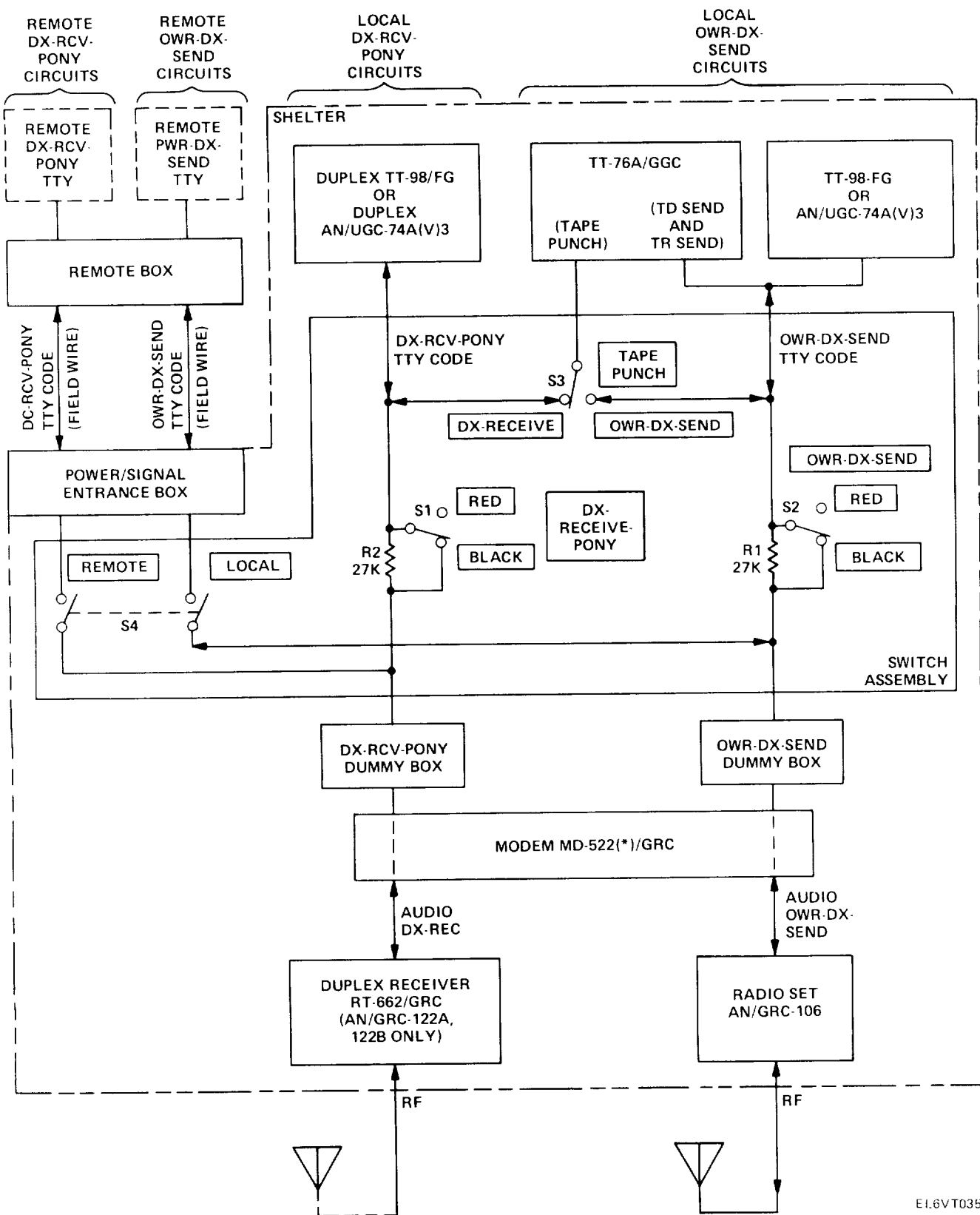
**LOCAL OWR/DUPLEX SEND CIRCUIT**

Loop current is present at DC LOOP NO. 1 DX SEND/OWR connector J6 of modem whenever modem is energized. The loop current follows path described below.

Loop current exits J6, enters switch assembly at J15, and is applied to tip of J19. If no external connection is made to J19, its tip and ring remain internally shorted. This internal short provides a path for current through LOCAL-REMOTE switch S4 back to modem to complete circuit. In this condition, a steady loop current (mark hold signal) exits in modem. This path exists only when S4 is in LOCAL position.

When connection is made to J19, loop current flows from tip of J19, makes a loop through dummy box, and reenters switch assembly at J10. The current exits switch assembly and completes a loop through page printer selector magnet of front TT-98/FG or AN/UGC-74A(V)3 via connector J7. From J7, current is applied to TAPE PUNCH switch S3. When S3 is set to OWR-DX-SEND position, current completes a loop through TT-76A/GGC tape punch selector magnet coil via J8. Current then flows through S3 and completes a loop through TT-98/FG or AN/UGC-74A(V)3 keyboard contacts via J2. If S3 is set to DX-RECEIVE position, loop current bypasses TT-76A/GGC tape punch selector magnet coil and is diverted to R3. Because R3 has approximately the same resistance as TT-76A/GGC tape punch selector magnet, resistance in loop, and therefore loop current, remain the same when S3 is in either position.

1-22. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142A, B, 7, AND E MODELS. (CONT)



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## 1-22. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)

From TT-981FG or AN/UGC-74A(V)3 keyboard contacts, current completes a loop through TT-76A/GGC TD send and TR send contacts via switch assembly connector J1. Upon reentering switch assembly, current is applied to OWR-DX-SEND switch S2. The function of S2 is to enable operator to vary loop current during secure operations. When set to RED position, S2 places resistor R1 in line to decrease loop current when operating with security equipment. When set to BLACK position, S2 provides alternate path for current around R1. From S2, current completes a loop through dummy box by exiting switch assembly at J4 and reentering on ring side of J19. Current flows through S4 and exits switch assembly at J15. The telegraph loop is completed when current enters modem at DC LOOP NO. 1 DX-SEND-OWR connector J6.

### LOCAL DUPLEX RECEIVE CIRCUIT (AN/GRC-122 ONLY)

Full duplex operation is possible only on AN/GRC-122(\*) models. During full duplex operations, incoming signal is received and converted to an audio fsk signal by duplex receiver RT-662/GRC. The signal is then applied to modem through AUX-RCVR-AUDIO connector J1. The modem converts fsk signals to teletypewriter code signals by generating interruptions in loop current. Loop current is present at DC LOOP NO. 2 DX-RCV-PONY connector J7 whenever modem is energized. The loop current circuit follows path described below.

The loop current exits receptacle J7, enters switch assembly at J14, and is then applied to tip of J18. If no external connection is made to J18, its tip and ring remain internally shorted. This intentional short provides a path for current through LOCAL-REMOTE switch S4 back to modem to complete circuit. In this condition, steady loop current in the form of mark hold signal exists in modem. This path exists only when S4 is in local position.

When connection is made to J18, loop current flows from tip of J18, makes a loop through dummy box, and reenters switch assembly at J9. With TAPE PUNCH switch S3 set to DX-RECEIVE, current exits switch assembly and completes a loop through TT-76A/GGC tape punch selector magnet coil via J8. The current then makes a loop through duplex TT-98/FG or AN/UGC-74A(V)3 page printer selector magnet coil, as applicable, via switch assembly connector J6. When S3 is set to OWR-DX-SEND position, resistor R3 is placed in series with duplex TT-98/FG or AN/GRC-74A(V)3 page printer selector magnet coil. Because R3 has approximately the same resistance as TT-76A/GGC tape punch selector magnet, resistance in loop, and therefore loop current, remain the same when S3 is in either position.

**1-22. LOCAL OWR/DUPLEX TELETYPEWRITER SEND AND RECEIVE CIRCUITS, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)**

From page printer selector magnet coil, current flows through switch assembly, dummy box, and associated connectors until it returns to TT-98/FG or AN/UGC-74A(V)3 where it is applied to keyboard contacts. Current leaves keyboard contacts and reenters switch assembly via J3. Inside switch box, current is routed to DX-RCV-PONY switch S1. The function of S1 is to enable operator to vary loop current during secure operations. When set to RED position, S1 places resistor R2 in line to decrease loop current when operating with security equipment. When set to BLACK position, S1 provides an alternate path for current around R2. In either case, current exits switch assembly at J5, flows through dummy box, and reenters switch assembly on ring side of connector J18. If LOCAL-REMOTE switch S4 is in the LOCAL position, current flows through S4 and exits switch assembly at J14. Circuit is completed when current enters modem at DC LOOP NO. 2 DX-RCV-PONY connector J7.

This same receive circuit may be utilized as a pony circuit between shelter and remote site. When used as a pony circuit, connection is made to the circuit at switch assembly via POWER/SIGNAL ENTRANCE BOX. Duplex TT-98/FG or AN/UGC-74A(V)3 is connected in series with the remote circuit.

**REMOTE DUPLEX CIRCUIT**

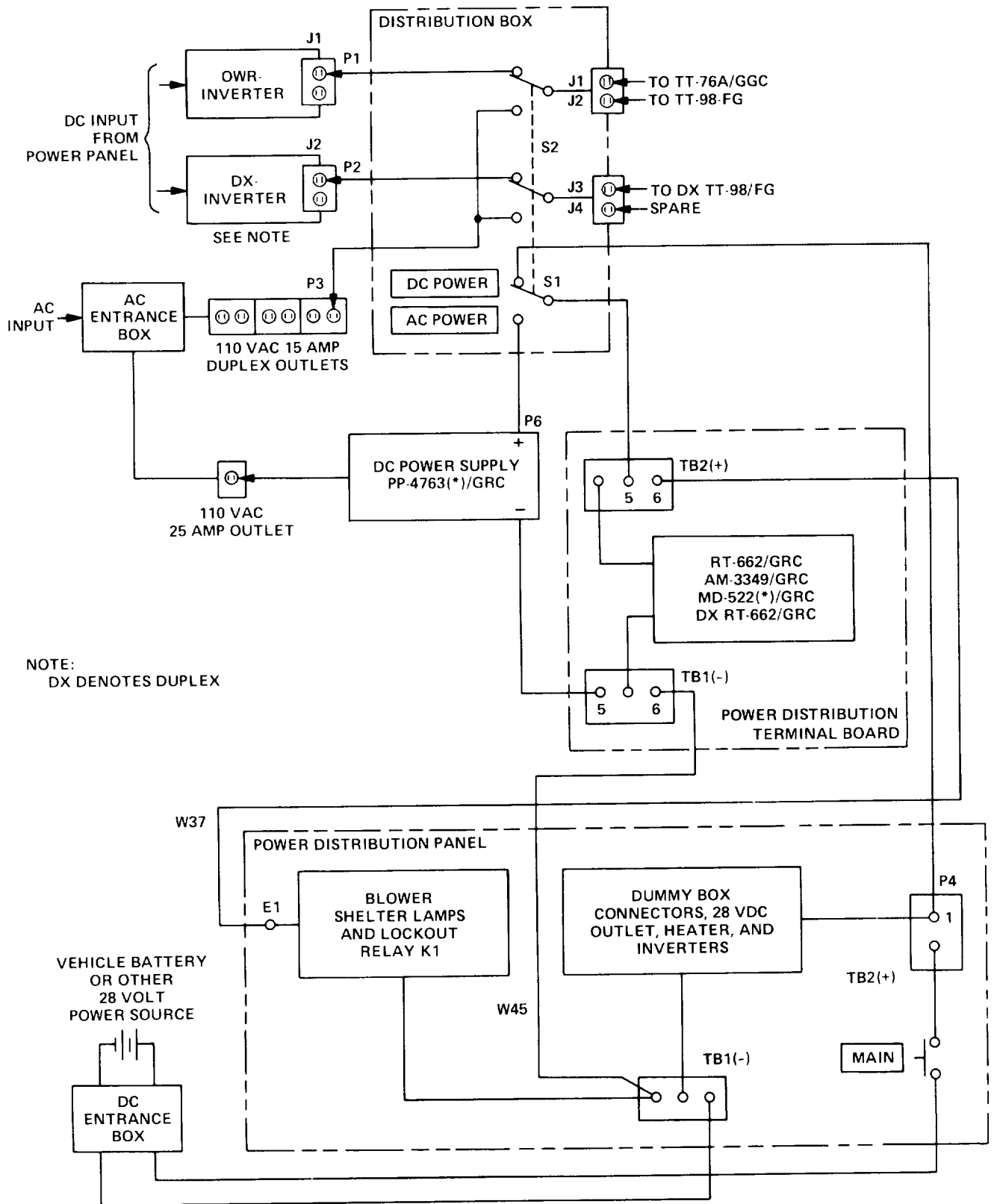
When LOCAL-REMOTE switch S4 is set to REMOTE position, six jacks in the remote box are connected in series with each teletypewriter loop circuit. Unused jacks are shorted internally to maintain continuity in loop. Both send and receive circuits are connected in same loop. This provides operator with simultaneous hard copy of messages transmitted by remote teletypewriters.

**1-23. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142 PLAIN AND C MODELS.**

**AC OPERATION**

When operating with an ac power source, MAIN circuit breaker in POWER DISTRIBUTION PANEL is set to OFF position to disconnect facility from vehicle electrical system. Ac power (115v, 60 Hz) is fed through J1 in AC ENTRANCE BOX. After passing through filters in entrance box, incoming power is split between two circuit breakers designated CB1 and CB2. Power controlled by CB1 is distributed to seven receptacles including J2. Receptacle J2 provides a connection point for the power cable supplying air conditioner in models so equipped (AN/G RC-142 Plain models, serial numbers 1 through 697 only).

1-23. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)



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**1-23. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)**

AC OPERATION (CONT)

Power controlled by CB2 is fed to the receptacle utilized by Power Supply PP-4763(\*)/GRC. The power supply converts ac into dc and applies resulting dc output to DC POWER/AC POWER switch S1 in DISTRIBUTION BOX. S1 is ganged with S2 and the two switches operate in tandem. With S1 set to AC POWER position (input to system), dc power is directed to TB2 in power distribution panel terminal board. Simultaneously, the teletypewriter receptacles are disconnected from the inverters by S2 and are connected to a 110 vac receptacle through P3. From the point where dc power is applied to TB2 in power distribution panel terminal board, remainder of power distribution circuit is as described in DC Operation.

DC OPERATION

Dc power required to operate AN/GRC-122/142(\*) is supplied by an external source which can be the electrical system of transporting vehicle. Dc power is fed through J1 in DC ENTRANCE BOX. After passing through a filter in entrance box, and MAIN circuit breaker CB1 power is applied to + bus bar TB2 in POWER DISTRIBUTION PANEL. From TB2, power is fed through paired fuses and switches to cables supplying heaters, inverters, security equipment, and CONVENIENCE outlet. In addition, power is tapped off TB2 and fed to DC POWER/AC POWER switch S1 in DISTRIBUTION BOX. S1 is ganged with S2 and the two switches operate in tandem. With S1 set to DC POWER position, power is directed to TB2 in power distribution panel terminal board. Simultaneously, teletypewriters are connected to inverters through S2.

TB2 provides connection points for cables that supply power to radio set, amplifier, and modem. A separate wire carries power from TB2 to terminal E1 in POWER DISTRIBUTION PANEL. From E1, +28 vdc is distributed through paired fuses and switches to control panel, blower, and lights.

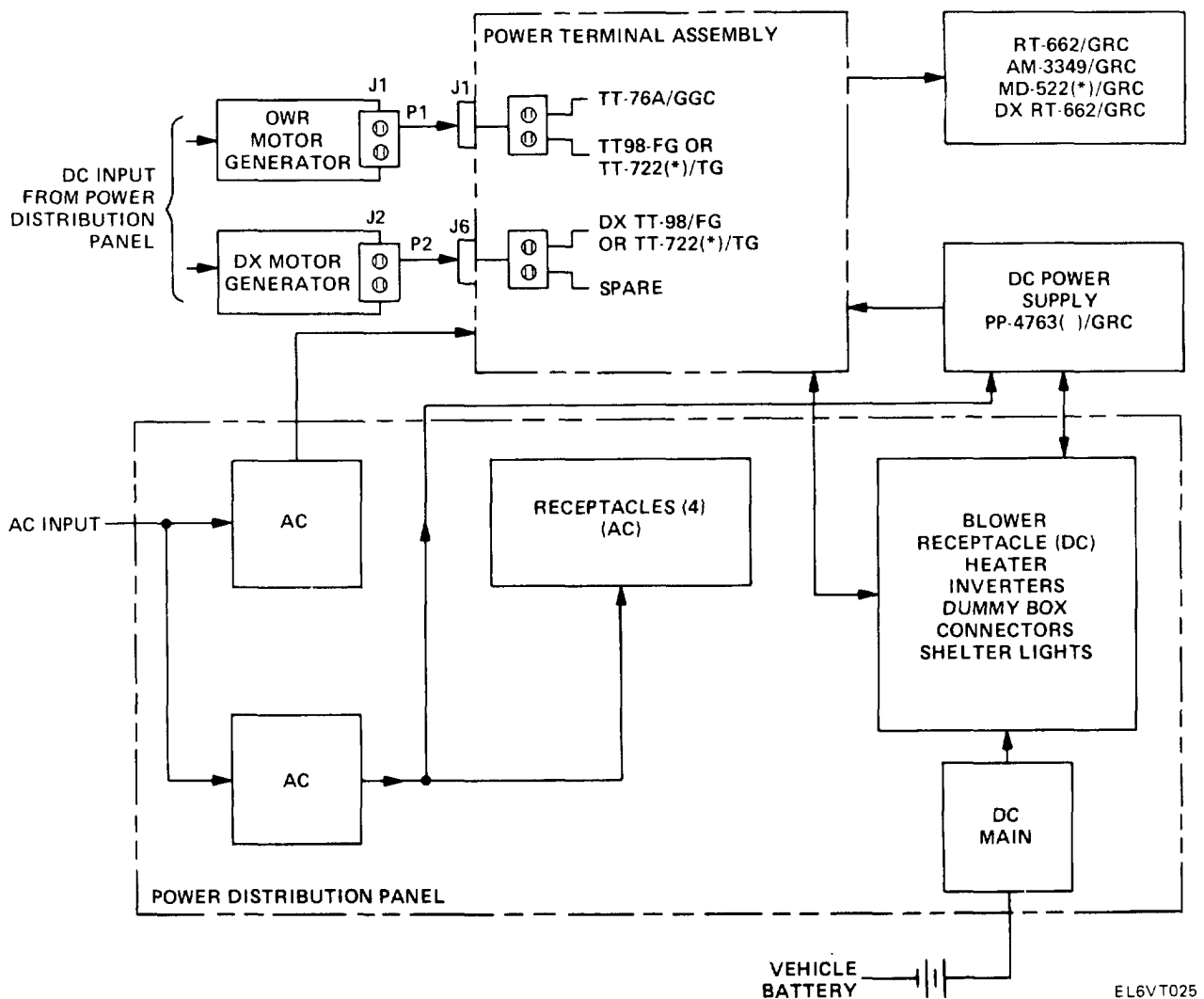
Dc return from radio set, amplifier, and modem is applied to TB1 in power distribution panel terminal board. TB1 is, in turn, connected to terminal E32 in DC ENTRANCE BOX. The bus bar TB1 in POWER DISTRIBUTION PANEL is also connected to E32. In this way, dc return from all circuits and components is fed to E32 in DC ENTRANCE BOX.

1-24. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142A AND B MODELS.

AC OPERATION

When operating with an ac power source, DC MAIN circuit breaker is pulled to disconnect facility from vehicle electrical system. Ac power (115 v, 60 Hz) is fed through J2 in POWER/SIGNAL ENTRANCE BOX. After passing through filters in entrance box, incoming power is split between two circuit breakers designated CB4 and CB5.

The portion of input power controlled by AC MAIN circuit breaker CB4 is routed to four 115V CONVENIENCE receptacles located within shelter. In addition, CB4 controls ac power that is applied to bridge rectifier through transformer T1. The resulting dc output energizes ac indicator lamp DS2 and activates meter M1. Meter M1 is calibrated in such a way as to express the measured dc voltage output from bridge rectifier in terms of required equivalent ac input to transformer. As ac input to T1 varies, dc output from rectifier will vary proportionately. Meter will then detect change and vary indication on ac or lower scale to reflect new input. Dc voltage produced by bridge rectifier and measured by M1 is fed through BLO & LIGHTS circuit breaker CB7 to overhead lights and shelter blower.



EL6VT025

**1-24. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142A AND B MODELS. (CONT)**

AC OPERATION (CONT)

Switches S2, S3, and S4 in POWER DISTRIBUTION PANEL are gauged and operate in tandem. When set to AC position, power controlled by CB4 is fed through S2 to receptacles J1, J2, J3, and J4. Receptacles J1, J2, and J3 supply power to teletypewriters, receptacle J4 serves as a spare. Receptacles J1 through J4 are located in the POWER TERMINAL ASSEMBLY. Power is also routed from CB4, through S3, to cables responsible for supplying power to OWR-DX-RCV equipment.

The portion of ac input controlled by PWR SUP circuit breaker CB5 is fed to Power Supply PP-4763/GRC. Dc output from power supply is applied to TB2 in POWER TERMINAL ASSEMBLY through power switch S4. From TB2, power is distributed to cables supplying radio set, amplifier, and modem. The amplifier vent blower also draws its power from TB2 through a dedicated 10 amp fuse and a switch.

The return for all dc circuits is routed through TB1 in POWER TERMINAL ASSEMBLY and TB1 in POWER DISTRIBUTION PANEL. Both of these components are connected to system ground terminal E32 in POWER/SIGNAL ENTRANCE BOX.

DC OPERATION

Dc power required to operate AN/GRC-122/142A and B models is supplied by an external source which can be the electrical system of the transporting vehicle. Dc power is fed through J1 in POWER/SIGNAL ENTRANCE BOX. After passing through a filter in entrance box, power is applied to DC MAIN circuit breaker CB1 located in POWER DISTRIBUTION PANEL. From circuit breaker, power is distributed to facility components as described below.

Dc input power is applied to J6 and J7 in POWER TERMINAL ASSEMBLY through circuit breakers CB3 and CB2, respectively. Receptacles J6 and J7 supply input power to DX and OWR inverters. The inverters convert this dc input to a 110 vac output. The resulting ac output is applied to receptacles J1, J2, J3, and J4 in POWER TERMINAL ASSEMBLY. Receptacles J1, J2, and J3 supply power to teletypewriters; receptacle J4 serves as a spare.

Switches S2, S3, and S4 in POWER DISTRIBUTION PANEL are ganged and operate in tandem. When set to DC position, POWER switch S4 directs dc input to POWER TERMINAL ASSEMBLY and applies power to TB2. From TB2, power is distributed to cables supplying radio set, amplifier, and modem. The amplifier vent blower also draws power from TB2 through a dedicated 10 amp fuse and a switch.

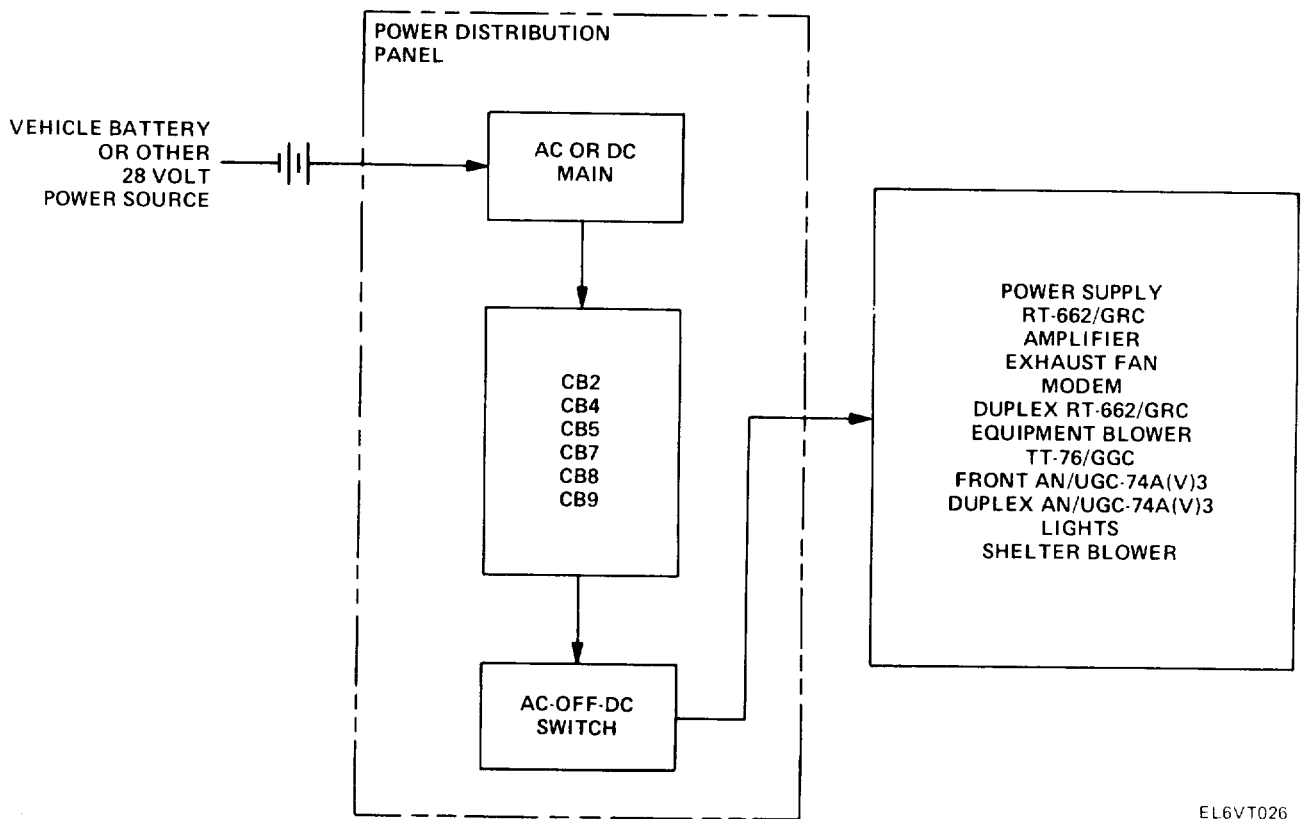
Switch S3, when set to DC position, applies power to overhead lights and shelter blower through CB7. Power is also applied through S3 to cables that supply security equipment when installed. When S3 is set to DC position, DC indicator lamp, DS1, is enabled and meter MI provides a dc voltage reading on its upper scale.

1-24. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142A AND B MODELS. (CONT)

Input power applied to + bus bar TB2 in POWER DISTRIBUTION PANEL is fed through CB6 to +28V CONVENIENCE receptacle and shelter heater.

The return for all dc circuits is routed through TB1 in POWER TERMINAL ASSEMBLY and TB1 in POWER DISTRIBUTION PANEL. Both of these components are connected to system ground terminal E32 in POWER/SIGNAL ENTRANCE BOX.

1-25. AC-OFF-DC SWITCH, AN/GRC-122/142D AND E MODELS.



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**1-25. AC-OFF-DC SWITCH AN/GRC-122/142D AND E MODELS. (CONT)**

The AC-OFF-DC switch S1, used only on AN/G RC-122/142D and E models, is located in POWER DISTRIBUTION PANEL. Switch S1 is a three-position, eight-wafer switch that enables operator to configure facility for use with either ac or dc power. When set to OFF position, ac or dc input power will still be applied to electric or all-fuel heater, as applicable, through CB3 or CB10, respectively. Power to these components bypass switch entirely. All other electrical components are connected to their associated circuit breakers through S1. The schematic in the back of this manual shows AC-OFF-DC switch S1 set to AC position. In this position, contact is established between terminals C and D, G and H, and K and L on each wafer. When set to DC position, contact is established between terminals A and B, E and F, and I and J on each wafer.

**1-26. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142D AND E MODELS.**

**AC OPERATION**

When operating with an ac power source, power (115v, 60 Hz) is fed through J1 in POWER ENTRANCE BOX. After passing through filters in entrance box, power is applied through CB1 to hot circuit breaker bus bar in POWER DISTRIBUTION PANEL. CB1 is a ganged, two-pole, 50-amp circuit breaker. Ac ammeter M2 installed in distribution panel provides indication of power consumption. From POWER DISTRIBUTION PANEL, power is delivered to facility components through CB2, CB3, CB4, and CB5. Ac neutral return for all these circuits is routed to circuit breaker neutral bus bar via TB4.

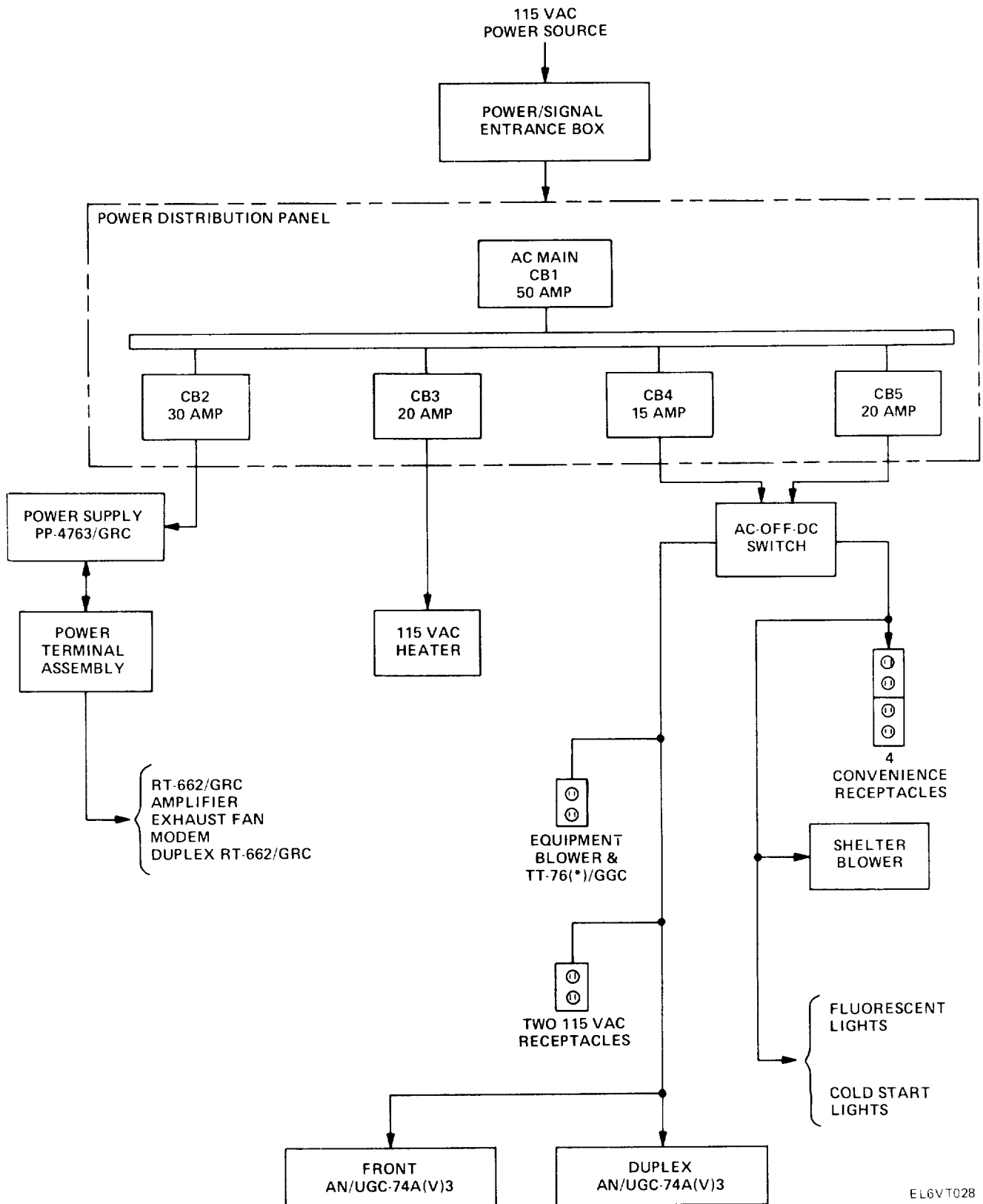
Through CB2, ac power is applied to power supply and its associated blower. When power supply is energized, resulting dc output is routed through AC-OFF-DC switch S1. When S1 is in AC position, coil of relay REL-2 is energized, closing associated switch and creating a path for dc current to TB2 in power terminal assembly. From TB2, power is distributed to radio set, amplifier, and modem. Dc return from each component, as well as coil of REL-2, is connected to TB1. Ac neutral return from power supply is connected to TB4.

Circuit breaker CB3 is dedicated to HEATER receptacle J6. Ac neutral return for J6 is connected to TB4.

Through CB4, power is applied to AC-OFF-DC switch S1 on four different terminals. When S1 is set to AC position, power is routed through switch to both AN/UGC-74A(V)3's, TT-76 receptacle, EQUIP BLO receptacle J7A, and two AUX EQUIP POWER receptacles. Two fuses on input side of S1 protect circuits supplying power to the two AN/UGC-74A(V)3's. Ac neutral return from each of these circuits is connected to TB4.



1-26. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142D AND E MODELS. (CONT)



EL6VT028

**1-26. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142D AND E MODELS. (CONT)**

AC OPERATION (CONT)

Through CB5, power is applied directly to two duplex CONVENIENCE receptacles J4 and J5. Ac neutral return from J4 and J5 is routed directly to TB4. CB5 also controls power applied to overhead lights and coldstart lights through S1. When S1 is set to AC position, power is applied to entrance door micro-switch S2 and BYPASS-BLACKOUT switch S3. When either or both of these switches is in closed position, a circuit is completed via S1 to the FLUOR & DC LTS switch S4 and COLD START switch S5. When S4 and/or S5 is set to ON position, current path is continued through the respective lamp circuits to TB4.

Power to SHELTER BLOWER receptacle J7B is also controlled by CB5. When S1 is set to AC position, power is applied to blower switch S6. When S6 is set to ON position, shelter blower circuit is completed through J7B to TB4.

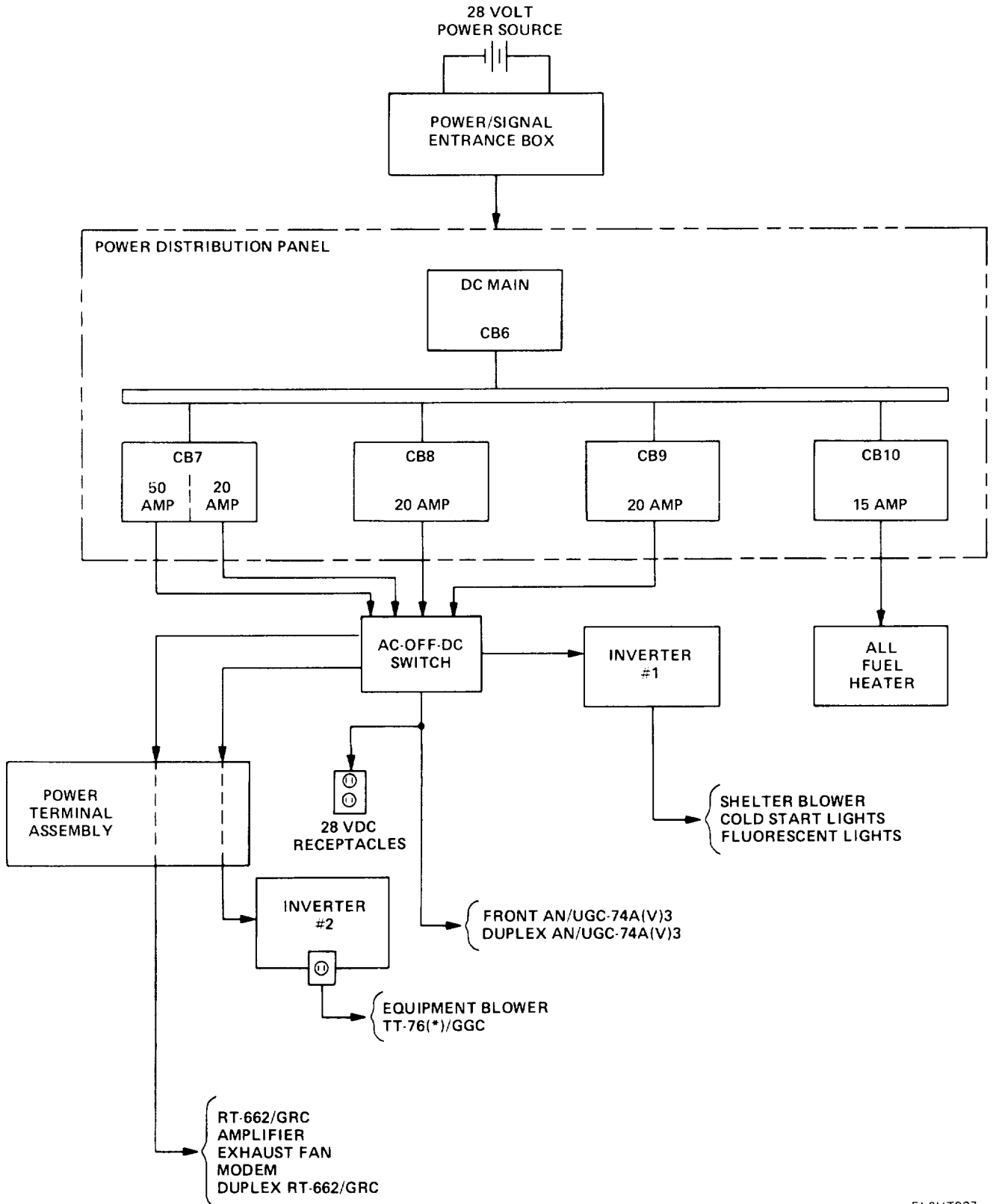
DC OPERATION

The dc power required to operate AN/GRC-122/142D and E models is supplied by an external source which can be the electrical system of the transporting vehicle. Dc power is fed through J2 in POWER ENTRANCE BOX. After passing through a filter in entrance box and dc ammeter M4 in POWER DISTRIBUTION PANEL, power is applied to circuit breaker positive bus bar through CB6. A power indicator lamp and a voltmeter are connected in parallel between the dc input and the negative bus bar. From POWER DISTRIBUTION PANEL, dc power is delivered to facility components through CB7, CB8, CB9, and CB10. Dc return from all circuits is routed to circuit breaker negative bus bar by way of TB3.

CB7 is a ganged, two-pole circuit breaker with one side rated at 50 amps, and the other side rated at 20 amps. The 20 amp side of CB7 controls power supplied to relay REL-4 through AC-OFF-DC switch S1. When S1 is set to DC position, coil of REL-4 is energized, closing associated switch and creating a path for dc current to INVERTER 2. The resulting ac output from inverter is routed through S1 to EQUIP BLO receptacle J7A and receptacle dedicated to TT-76A/GGC.

The 50 amp side of CB7 controls power supplied to relay REL-1 through AC-OFF-DC switch S1. When S1 is in DC position, coil of REL-1 is energized, closing associated switch and creating a path for dc current to TB2 in power terminal assembly. From TB2, power is distributed to radio set, amplifier, and modem. Dc return from each component, as well as coil of REL-1, is connected to TB3.

1-26. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142D AND E MODELS. (CONT)



EL6VT027

**1-26. AC AND DC POWER DISTRIBUTION, AN/GRC-122/142D AND E MODELS. (CONT)**

DC OPERATION (CONT)

Through CB8, power is applied to both AN/UGC-74A(V)3 and two AUX EQUIP POWER receptacles through switch S1. When S1 is set to DC position, power is applied to curbside AN/UGC-74A(V)3 and AUX EQUIP POWER receptacles by way of TB7. Power is applied to front AN/UGC-74A(V)3 by way of TB5. Dc return from AUX EQUIP POWER receptacles and from both AN/UGC-74A(V)3's is routed to TB3 via TB6.

Through CB9, power is applied to relay REL-3 via AC-OFF-DC switch S1. When S1 is set to DC position, coil of relay REL-3 is energized, closing associated switch and creating a path for dc current to INVERTER 1. The resulting ac output from inverter is routed through S1 to entrance door micro-switch S2 and BYPASS/BLACKOUT switch S3. When either or both of these switches is in the closed position, a circuit is completed via S1 to FLUOR 4 DC LTS switch S4 and COLD START switch S5. When S4 and/or S5 is set to ON position, current path is continued through respective lamp circuits to TB3 by way of TB4.

INVERTER 1 also supplies ac power to SHELTER BLOWER receptacle J7B through S1 and S6. When S1 is set to DC position and S6 is set to ON position, shelter blower circuit is completed through J7B to TB3 via TB4.

Circuit breaker CB10 is dedicated to all fuel heater and, when set to ON, applies power directly to heater. Dc return from heater is connected to TB3.

## CHAPTER 2

### DIRECT SUPPORT MAINTENANCE

Subject	Section	Page
Repair Parts, Special Tools, TMDE, and Support Equipment . . . . .	I	2-1
Direct Support Maintenance Procedures . . . . .	III	2-42

**OVERVIEW**

This chapter contains direct support repair procedures for the AN/GRC-122/142(\*) radio tty sets.

#### Section I REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Subject	Para	Page
Common Tools and Equipment . . . . .	2-1	2-1
Special Tools, TMDE, and Support Equipment . . . . .	2-2	2-2
Repair Parts. . . . .	2-3	2-2

**2-1. COMMON TOOLS AND EQUIPMENT**

Common tools and equipment needed to perform troubleshooting and maintenance tasks are listed in the following table.

#### REQUIRED TEST EQUIPMENT AND TOOLS

Test Equipment and Tools	NSN	Publication
Test Set, Radio AN/GRM-114A	6625-01-144-4481	TM 11-6625-3016-10
Multimeter, Digital AN/PSM45	6625-01-139-2512	TM 11-6625-3052-14
Wattmeter AN/URM-120	6625-00-813-8430	TM 11-6625-446-15
Tool Kit, Electronic Equipment TK/100/G	5810-00-605-0079	SC 5180-91-CL-S21
Tool Kit Electronic Equipment TK-105/G	5180-00-610-8177	SC 5180-91-CL-R07
Power supply capable of supplying 150 vdc at 100 ma	---	---

\* Multimeters ME-26A, ME-26C/U, and ME-26D may also be used.

**2-1. COMMON TOOLS AND EQUIPMENT. (CONT)**

REQUIRED TEST EQUIPMENT AND TOOLS (CONT)

Test Equipment and Tools	NSN	Publication
Power Supply capable of supplying $\pm 28$ vdc	—	—

**2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.**

There are no special tools or equipment needed to maintain the AN/GRC-122/142(\*) radio sets.

**2-3. REPAIR PARTS.**

Repair parts and tools required for direct support maintenance are listed in TM 11-5815-334-20P.

**Section II DIRECT SUPPORT TROUBLESHOOTING**

Subject	Para	Page
General .....	2-4	2-2
Symptom Index .....		2-3
Troubleshooting Switch Assembly SA-1554/GRC-142 (Control Panel), AN/GRC-122/142 Plain and C Models .....	2-5	2-24
Troubleshooting Switch Box SA-1555/GRC-142, AN/G RC-122/142 Plain and C Models .....	2-6	2-26
Troubleshooting Switch Assembly SA-1650/GRC, AN/GRC-122/142A, B, D, and E Models .....	2-7	2-27
Troubleshooting Power Terminal Assembly, AN/GRC-122/142A, B, D, and E Models .....	2-8	2-30
Troubleshooting AC and DC Entrance Boxes, AC/DC Distribution Box, Interconnecting Box J-2728/GRC-142, Remote Control C-7279/GRC-142, and Power/Signal Entrance Box .....	2-9	2-31

**2-4. GENERAL.**

Troubleshooting procedures in this manual are based on organizational troubleshooting checks (TM 11-5815-334-20) which have sectionalized the fault or narrowed the problem down to a unit of the shelter. AN/GRC-122/142(\*) can then be returned to normal operation by removal and replacement of defective unit. Once defective unit has been removed, the fault will be localized to a component of the unit and repaired.

**WARNING**

When checking continuity, always disconnect power to prevent electrical shock to personnel.

**2-4. GENERAL. (CONT)**

Most major units of radio tty sets do not contain electronic circuits. Troubleshooting these units is accomplished by referring to applicable foldout at rear of manual and performing continuity checks and resistance measurements.

Many problems can be diagnosed by a visual inspection. Problems such as burnt out resistors, arcing and shorted transformers, leaking capacitors, and damaged wiring or connectors can be located by sight, smell, or sound.

In all tests, intermittent troubles are always a possibility. If this condition exists, try tapping or jarring component. Always check that all plugs and plug in modules are properly seated in their connectors. Minute cracks in printed circuit boards may also cause intermittent operation.

When testing for voltage, allow a  $\pm 5$  percent variance for  $\pm 28$  vdc checks, and allow 10 percent variance for 115 vac checks.

The troubleshooting table does not list all problems you may find. If the problem is not listed, or troubleshooting steps do not solve the problem, report it to a higher category of maintenance.

When working on any problem, be sure to report your work on forms shown in DA Pam 738-750.

To use the troubleshooting table, first find the problem in the symptom index. The symptom index is organized in three categories: Power Distribution Panel SB-3018/GRC, Power Distribution Panel SB-3358/GRC, Power Distribution Panel SC-F-960672.

Additional troubleshooting procedures for point to point testing of control panel, switch box, switch assembly, and power terminal assembly are given in paragraphs 2-5, 2-6, 2-7, and 2-8, respectively. All other units of the shelter that do not contain electronic components and require continuity testing are given in paragraph 2-9.

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**TROUBLESHOOTING**

**MALFUNCTION**

**TEST OR INSPECTION**

**CORRECTIVE ACTION**

**POWER DISTRIBUTION PANEL SB-3018/GRC, AN/GRC-122/142 PLAIN AND C MODELS (See FO-8.)**

1. No indication of power at voltmeter or indicator lamp. Equipment does not operate.
  - Step 1. Check for +28 vdc between terminal 1 on circuit breaker CB1 and terminal 16 of TB1.
 

If +28 vdc is present, repair or replace circuit breaker or associated wiring (para 2-25).
  - Step 2. Check for +28 vdc between terminals of filter FL1.
 

If +28 vdc is not present, repair or replace filter or associated wiring (para 2-24).
  - Step 3. Check for loose or broken wires on power input receptacle J1.
 

If loose, broken, or improperly connected wires are present, repair (para 2-30).
  - Step 4. Check for continuity between terminal 16 of TB1 and power connector J1 pin C.
 

If continuity is not present, repair or replace associated wiring.

## TROUBLESHOOTING (CONT)

### MALFUNCTION

#### TEST OR INSPECTION

#### CORRECTIVE ACTION

2. Voltmeter indication seems incorrect. Power indicator lamp lights. Equipment functions normally.

Check for defective voltmeter M1 and associated wiring.

If voltmeter or wiring is defective, repair or replace.

3. Overhead lamps do not light when LIGHTS switch S1 is set to ON position and shelter door is closed.

Step 1. Check continuity of LIGHTS switch S1.

If continuity is not present, replace switch (para 2-26).

Step 2. Check continuity of blackout microswitch and associated wiring.

If continuity is not present, replace or repair blackout microswitch or associated wiring (para 2-26).

4. Blower does not operate when BLOWER switch is set to ON.

Step 1. Check continuity of BLOWER switch S2.

If continuity is not present, replace switch (para 2-26).

Step 2. Set BLOWER switch S2 to ON and check for +28 vdc at terminal board of blower.

If +28 vdc is present, repair or replace blower. See TM 11-5815-334-20.

Step 3. Check continuity of cable W21.

If continuity is not present, repair or replace cable.

5. Lockout relay K1 does not energize. Equipment functions normally.

Step 1. Check for +28 vdc at terminal E1 in power distribution panel.

If +28 vdc is not present, repair or replace cable.

Step 2. Check continuity of LOCK-OUT switch S3.

If continuity is not present, replace switch (para 2-26).

**TROUBLESHOOTING (CONT)**

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

Step 3. Set LOCK-OUT switch S3 to ON and check for +28 vdc between cable W29P1-C and W21P1-D.

If +28 vdc is not present, repair or replace cables.

6. +28 vdc not present at the +28 volt convenience receptacle with 28V RECP switch set to ON.

Step 1. Check continuity of 28V RECP switch S4.

If continuity is not present, replace switch (para 2-26)

Step 2. Check continuity of 28 volt receptacle.

If continuity is not present, replace receptacle (para 2-32).

Step 3. Check continuity of cable W16.

If continuity is not present, repair or replace cable.

7. OWR inverter does not operate when INVERTERS-OWR switch is set to ON.

Step 1. Check continuity of INVERTERS-OWR switch S5.

If continuity is not present, replace switch (para 2-26).

Step 2. Check for +28 vdc between cable W23P1-A and W23P1-C.

If +28 vdc is not present, repair or replace cable.

8. DX inverter does not operate when INVERTERS-DX switch is set to ON.

Step 1. Check continuity of INVERTERS-DX switch S6.

If continuity is not present, replace switch (para 2-26).

Step 2. Check for +28 vdc between W22P1-A and W22P1-C.

If +28 vdc is not present, repair or replace cable.

## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

9. OWR-DX-SEND security equipment does not operate.

Check for +28 vdc between cable W28P1-A and W28P1-C.

If +28 vdc is not present, repair or replace cable.

10. DX-RCV-PONY security equipment does not operate.

Check for +28 vdc between cable W30P1-A and W30P1-C.

If +28 vdc is not present, repair or replace cable.

POWER DISTRIBUTION PANEL SB-3358/GRC,  
AN/GRC-122/142A AND B MODELS  
(See FO-10.)

1. No indication of power on voltmeter or DC indicator lamp during dc operation. Equipment does not operate.

Step 1. Check for +28 vdc between terminal 1 of TB1 and terminal 1 of circuit breaker CB1.

If voltage is present, replace circuit breaker (para 2-25).

Step 2. Check for +28 vdc at filter FL11.

If +28 vdc is not present, replace filter (para 2-24).

Step 3. Check for loose or broken wires on power input receptacle J1.

If loose, broken, or improperly connected wires are present, repair (para 2-3).

Step 4. Check continuity between terminal 10 of TB1 and power connector J1 pin C.

If continuity is not present, repair or replace wiring.

## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

2. No indication of power on voltmeter or AC indicator lamp during ac operation. Equipment does not operate.

Step 1. Check for loose or broken wires on power input receptacle J2.

If loose, broken, or improperly connected wires are present, repair (para 2-30).

Step 2. Check for +28 vdc at filters FL12 and FL13.

If +28 vdc is not present, replace filter(s) (para 2-24).

Step 3. Check continuity of AC MAIN circuit breaker, CB4.

If continuity is not present, replace circuit breaker (para 2-25).

3. No indication on voltmeter in either ac or dc mode or corresponding AC or DC indicator lamp lights.

Check continuity of voltmeter M2.

If continuity is not present, replace voltmeter (para 2-27).

4. Overhead lamps do not light when BLO & LIGHTS circuit breaker CB7 is set to ON and shelter door is closed.

Step 1. Check continuity of BLO & LIGHTS circuit breaker CB7.

If continuity is not present, replace circuit breaker (para 2-25).

Step 2. Check continuity of blackout microswitch.

If continuity is not present, adjust or replace corresponding microswitch.

Step 3. Check continuity of POWER DC-AC switch S3, between terminals 2 and 3 (for dc mode) or 2 and 1 (for ac mode), as applicable.

If continuity is not present, replace switch.

## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

5. Overhead lamps are dim and voltmeter indication is low. Shelter blower does not operate up to speed (ac operation only).

Step 1. Check for output of 32 vac at pins 6 and 10 and input of 115 vac at pins 2 and 4 of transformer T1.

If transformer output is less than 32 vac and input is 115 vac, replace transformer.

Step 2. Check condition of diodes in bridge rectifier.

If diodes are defective, replace.

6. Blower does not operate when BLO-ON-OFF switch is set to ON.

Step 1. Set BLO-ON-OFF switch to ON and check for +32 vdc at blower terminal board.

If +32 vdc is present, repair or replace blower and/or terminal board wiring.

Step 2. Check continuity of BLO-ON-OFF switch S1.

If continuity is not present, replace switch (para 2-26).

7. Power Supply PP-4763(\*)/GRC does not operate (ac mode only).

Step 1. Check for 115 vac at receptacle J5 of power terminal assembly.

If 115 vac is present at J5, repair or replace power supply.  
See appendix A for applicable TM.

Step 2. Check continuity of PWR SUP circuit breaker CB5.

If continuity is not present, replace circuit breaker (para 2-25).

8. No power available at radio set, amplifier, or modem with power supply operating normally (ac mode only).

Check continuity of DC-AC switch S4.

If continuity is not present, replace switch (para 2-26).

## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

9. +28 vdc not present at 28 volt convenience outlet and shelter heater does not operate (dc mode only).

Check continuity of RECP circuit breaker CB6 and associated wiring.

If continuity is not present, replace circuit breaker or associated wiring (para 2-25).

10. No voltage available for duplex equipment via cables W68 and W69 (ac mode) or W28 and W30 (dc mode).

Check continuity of POWER DC-AC switch S3 and associated wiring.

If continuity is not present, replace switch or associated wiring (para 2-26).

11. OWR inverter does not operate (dc mode only).

Step 1. Check for +28 vdc at power terminal assembly connector J6

If +28 vdc is present at J6, repair or replace OWR inverter. See appendix A for applicable TM.

Step 2. Check continuity of OWR circuit breaker CB2.

If continuity is not present, replace circuit breaker (para 2-25).

12. DX inverter does not operate (dc mode only).

Step 1. Check for +28 vdc at power terminal assembly J7.

If +28 vdc is present, repair or replace DX inverter. See appendix A for applicable TM.

Step 2. Check continuity of DX circuit breaker CB3.

If continuity is not present, replace circuit breaker (para 2-25).



## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

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 POWER DISTRIBUTION PANEL SC-F-960672, AN/GRC-122/142D AND E MODELS (AC OPERATION)  
 (See FO-11.)
 

---

1. No indication of power at AC VOLTS meter and AC AMPS meter. Power indicator lamp does not light.

Step 1. Check for 110 vac between TB4 and terminal 1 of AC MAIN circuit breaker CB1.

If 115 vac is present, replace circuit breaker (para 2-25).

Step 2. Check continuity of AC AMPS meter.

If continuity is not present, replace meter (para 2-27).

Step 3. Check for 115 vac at filter FL12 and FL13 and associated wiring.

If 115 vac is not present, replace filter(s) or associated wiring (para 2-24).

Step 4. Check for loose or broken wires connected to connector J1.

If loose, broken, or improperly connected wires are present, repair.

2. AC VOLTS meter does not indicate. AC AMPS meter functions properly and AC indicator lamp lights.

Check for 115 vac at AC VOLTS meter.

If 115 vac is present, meter is defective. Replace (para 2-27).

3. DC VOLTS meter does not indicate. DC AMPS meter functions properly and DC indicator lamp lights.

Check for +28 vdc at DC VOLTS meter.

If +28 vdc is present, meter is defective. Replace (para 2-27).

**TROUBLESHOOTING (CONT)**

---

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

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4. Power Supply PP-4763(\*)/GRC does not operate.

Step 1. Check for 115 vac at power terminal assembly connector J5.

If 115 vac is present, repair or replace power supply. See appendix A for applicable TM.

Step 2. Check continuity of PWR SPLY circuit breaker CB2.

If continuity is not present, replace circuit breaker (para 2-25).

5. Amplifier, modem, and radio set fail to operate. Power supply functions normally.

Step 1. Check continuity between terminal A of power supply output and terminal X2 of relay REL-2.

If continuity is not present, repair or replace switch S1 or associated wiring (para 2-33).

Step 2. Check for continuity between terminals X1 and X2 on relay REL-2.

If continuity is not present, replace relay.

Step 3. Check for continuity between terminal X1 of relay REL-2 and TB3.

If continuity is not present, repair or replace associated wiring.

Step 4. With power supply PP-4763(\*)/GRC operating, check for +28 vdc on terminal A1 of relay REL-2.

If +28 vdc is not present, replace relay.

## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

6. Electric heater does not operate.

Step 1. Check for 115 vac between TB4 and electric circuit breaker CB3.

If 115 vac is not present, replace circuit breaker (para 2-25).

Step 2. Check continuity of HTR receptacle.

If continuity is not present, replace receptacle (para 2-32).

7. Front and duplex AN/UGC-74A(V)3's, equipment blower, and TT-76(\*)/GGC fail to operate.

Check for 115 vac between TB4 and TTY & AUX EQUIP BLWR circuit breaker CB4.

If 115 vac is not present, replace circuit breaker (para 2-25).

8. Front AN/UGC-74A(V)3 does not operate. Duplex AN/UGC-74A(V)3, equipment blower, and TT-76(\*)/GGC function normally.

Check for defective fuse F1.

If fuse is defective, replace.

9. Duplex AN/UGC-74A(V)3 does not operate. Front AN/UGC-74A(V)3, equipment blower, and TT-76(\*)/GGC function normally.

Check for defective fuse F2.

If fuse is defective, replace.

10. Power is not available at AUX EQUIP POWER receptacle(s) and all other equipment functions normally.

Step 1. Check for 115 vac between terminals 9 and 10 of TB5.

If voltage is present, replace receptacle(s) or associated wiring (para 2-32).

Step 2. Check continuity of switch S1.

If continuity is not present, repair or replace switch.

**TROUBLESHOOTING (CONT)**

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

11. Fluorescent lights and shelter blower do not operate, and no power is available at convenience outlets. LTS & CONV SHLTR BLWR indicator lamp does not light.

Check for 115 vac between TB4 and LTS & CONV SHLTR BLWR circuit breaker CB5.

If 115 vac is not present, replace circuit breaker (para 2-25).

12. Overhead lamps do not light with BYPASS-BLACKOUT switch S3 set to BLACKOUT and shelter door is closed.

Check continuity of microswitch S-1.

If continuity is not present and switch cannot be corrected by adjustment, replace.

13. Overhead lamps do not light with BYPASS-BLACKOUT switch S3 set to BYPASS with shelter door closed.

Step 1. Check continuity of BLACKOUT-BYPASS switch S3.

If continuity is not present, replace switch (para 2-33).

Step 2. Check continuity of FLUOR LTS switch S4.

If continuity is not present, replace switch (para 2-33).

Step 3. Check continuity of AC-OFF-DC switch S1.

If continuity is not present, replace switch.

14. Power is not available at 115 vac convenience receptacles.

Step 1. Check for 115 vac between terminal 3 of TB8 and TB4.

If 115 vac is present, repair or replace receptacles(s) or associated wiring (para 2-32).

Step 2. Check continuity of AC-OFF-DC switch and associated wiring,

If continuity is not present, repair or replace switch or associated wiring.

## TROUBLESHOOTING (CONT)

### MALFUNCTION

#### TEST OR INSPECTION

#### CORRECTIVE ACTION

15. Cold start lamps do not light. Shelter blower operates normally.

Step 1. Check for 115 vac between terminal 10 of TB6 and TB4.

If 115 vac is not present, repair or replace AC-OFF-DC switch or associated wiring.

Step 2. Check continuity of COLD START switch S5 and associated wiring.

If continuity is not present, replace switch or associated wiring-  
(para 2-33).

16. Shelter blower does not operate with switch S6 set to ON.

Step 1. Check for 115 vac between terminal 1 of TB8 and TB4.

If 115 vac is not present, repair or replace AC-OFF-DC switch or associated wiring.

Step 2. Check continuity of SHELTER BLOWER switch S6 and associated wiring.

If continuity is not present, replace switch or associated wiring  
(para 2-33).

Step 3. Check continuity of shelter blower receptacle.

If continuity is not present, replace receptacle (para 2-32).

### POWER DISTRIBUTION PANEL SC-F-960672, AN/GRC-122/142D AND E MODELS (DC OPERATION) (SEE FO-11.)

1. No indication of power at DC VOLTS meter and DC AMPS meter. Power indicator lamp does not light.

Step 1. Check for +28 vdc between TB3 and Terminal 1 of DC MAIN circuit breaker CB6.

If +28 vdc is present, replace circuit breaker (para 2-25).

**TROUBLESHOOTING (CONT)**

**MALFUNCTION**

**TEST OR INSPECTION**

**CORRECTIVE ACTION**

1. No indication of power at DC VOLTS meter and DC AMPS meter. Power indicator lamp does not light. (Cont)

Step 2. Check continuity of DC AMPS meter.

If continuity is not present, replace meter (para 2-26).

Step 3. Check continuity of filter FL11 and associated wiring.

If continuity is not present, replace filter or associated wiring (para 2-24).

Step 4. Check for loose or broken wires connected to contacts of connector J2.

If loose, broken, or improperly connected wires are present, repair or replace.

Step 5. Check continuity between TB3 and pin C of receptacle J2.

**NOTE**

Circuit breaker CB7 is a double-ganged circuit breaker. The 50-amp side supplies +28 vdc to radio set, modem, and duplex RT-662/GRC. The 20-amp side supplies +28 vdc to OWR-DX-SEND inverter which generates 115 vac used to power equipment blower and TT-76(\*)/GGC.

2. Amplifier, modem, and radio set fail to operate. Equipment blower and TT-76(\*)/GGC function normally.

Step 1. Check for +28 vdc between RADIO TTY EQUIP BLWR circuit breaker CB7 (50 amp side) and TB3.

If +28 vdc is not present, replace circuit breaker (para 2-25).

Step 2. Check continuity between 50 amp side of circuit breaker CB7 and terminal X2 of relay REL-1.

If continuity is not present, replace switch S1 or associated wiring.

## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

Step 3. Check continuity between terminals X1 and X2 on relay REL-1.

If continuity is not present, replace relay,

Step 4. Check continuity between terminal X1 of relay REL-1 and TB3.

If continuity is not present, repair or replace associated wiring.

Step 5. Check for +28 vdc on terminal A1 of relay REL-1 and TB3.

If +28 vdc is not present, replace relay.

3. Inverter 2 does not energize when RADIO TTY EQUIP BLWR circuit breaker CB7 is set to ON. Radio set, modem, and duplex RT-662/GRC operate normally.

Step 1. Check for +28 vdc between RADIO TTY EQUIP BLWR circuit breaker CB7 (20 amp side) and terminal board TB3.

If +28 vdc is not present, replace circuit breaker (para 2-25).

Step 2. With AC-OFF-DC switch set to DC, check continuity between 20 amp side of circuit breaker and terminal X2 of relay REL-4.

If continuity is not present, repair or replace switch S1 or associated wiring.

Step 3. Check continuity between terminals X1 and X2 on relay REL-4.

If continuity is not present, replace relay.

Step 4. Check continuity between terminal X1 of relay REL-4 and TB3.

If continuity is not present, repair or replace associated wiring.

Step 5. With CB7 set to ON, check for +28 vdc on terminal A2 of relay REL-4.

If +28 vdc is not present, replace relay.

**TROUBLESHOOTING (CONT)**

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

4. Equipment blower and TT-76(\*)/GGC do not energize. Inverter 2 and all other equipment operate normally.

Step 1. Check for 115 vac between terminals 7 and 8 of TB8.

If 115 vac is not present, repair or replace wiring between plug P3 of inverter 2 and TB8.

Step 2. Check for 115 vac between terminal 10 of TB7 and TB4.

If 115 vac is not present, repair or replace switch S1 or associated wiring.

Step 3. Check continuity of receptacle J7A and associated wiring.

If continuity is not present, repair or replace receptacle J7A or associated wiring (para 2-32).

5. Front and duplex AN/UGC-74A(V)3 do not operate. No power at AUX EQUIP POWER 28 VDC receptacles and UGC-74 AUX indicator lamp does not light.

Check for +28 vdc between UGC-74 AUX circuit breaker CB8, and terminal board TB3.

If +28 vdc is not present, replace circuit breaker (para 2-25).

6. Front AN/UGC-74A(V)3 does not operate. All other equipment operates normally.

Step 1. Check for +28 vdc between terminal 1 of TB5 and TB3.

If + 28 vdc is not present, repair AC-OFF-DC switch S1 or associated wiring.

Step 2. Check for +28 vdc between pin M on connector P1 and TB3.

a. If +28 vdc is not present, repair or replace power cable.

b. If +28 vdc is present, refer to TM 11-5815-602-34 and Troubleshoot AN/UGC-74A(v)3.



## TROUBLESHOOTING (CONT)

## MALFUNCTION

## TEST OR INSPECTION

## CORRECTIVE ACTION

7. No power available at AUX EQUIP POWER 28 VDC receptacles. All other equipment operates normally.

Step 1. Check for +28 vdc between terminal 9 of TB7 and TB3.

If +28 vdc is not present, repair AC-OFF-DC switch S1 or associated wiring.

Step 2. Check continuity of AUX EQUIP POWER receptacles and associated wiring.

If continuity is not present, repair or replace AUX EQUIP POWER receptacles or associated wiring (para 2-32).

8. Inverter 1 does not energize when LTS SHLTR BLWR circuit breaker CB9 is set to ON.

Step 1. Check for +28 vdc between LTS SHLTR BLWR circuit breaker CB9 and TB3.

If +28 vdc is not present, replace circuit breaker (para 2-25).

Step 2. Check continuity between LTS SHLTR BLWR circuit breaker CB9 and terminal X2 of relay REL-3.

If continuity is not present, repair AC-OFF-DC switch S1 or associated wiring.

Step 3. Check continuity between terminals X1 and X2 on relay REL-3.

If continuity is not present, replace relay.

Step 4. Check continuity between terminal X1 of relay REL-3 and TB3.

If continuity is not present, repair or replace associated wiring.

Step 5. With CB9 set to ON, check for +28 vdc on terminal A2 of relay REL-3.

If +28 vdc is not present on terminal A2, replace relay.

**TROUBLESHOOTING (CONT)**

---

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

---

9. Shelter blower and overhead lights do not operate. Inverter 1 operates normally.

Check continuity of AC-OFF-DC switch S1 and associated wiring.

If continuity is not present, repair switch S1 or associated wiring.

10. Shelter blower does not operate. All other equipment operates normally.

Step 1. Check for +28 vdc between terminal 1 of TB8 and TB3.

If +28 vdc is not present, repair switch S1 or associated wiring.

Step 2. Check continuity of SHELTER BLOWER switch S6.

If continuity is not present, replace switch S6 (para 2-33)

Step 3. Check continuity of SHELTER BLOWER receptacle J7B.

If continuity is not present, replace receptacle (para 2-32).

11. Overhead lamps do not light with BYPASS-BLACKOUT switch S3 set to BLACKOUT and shelter door is closed.

Check microswitch for continuity.

If continuity is not present, and microswitch cannot be corrected by adjustment, replace.

12. Overhead lamps do not light with BYPASS-BLACKOUT switch S3 set to BYPASS. Shelter blower functions normally.

Step 1. Check continuity of BYPASS-BLACKOUT switch S3.

If continuity is not present, replace switch (para 2-33).

## TROUBLESHOOTING (CONT)

## MALFUNCTION

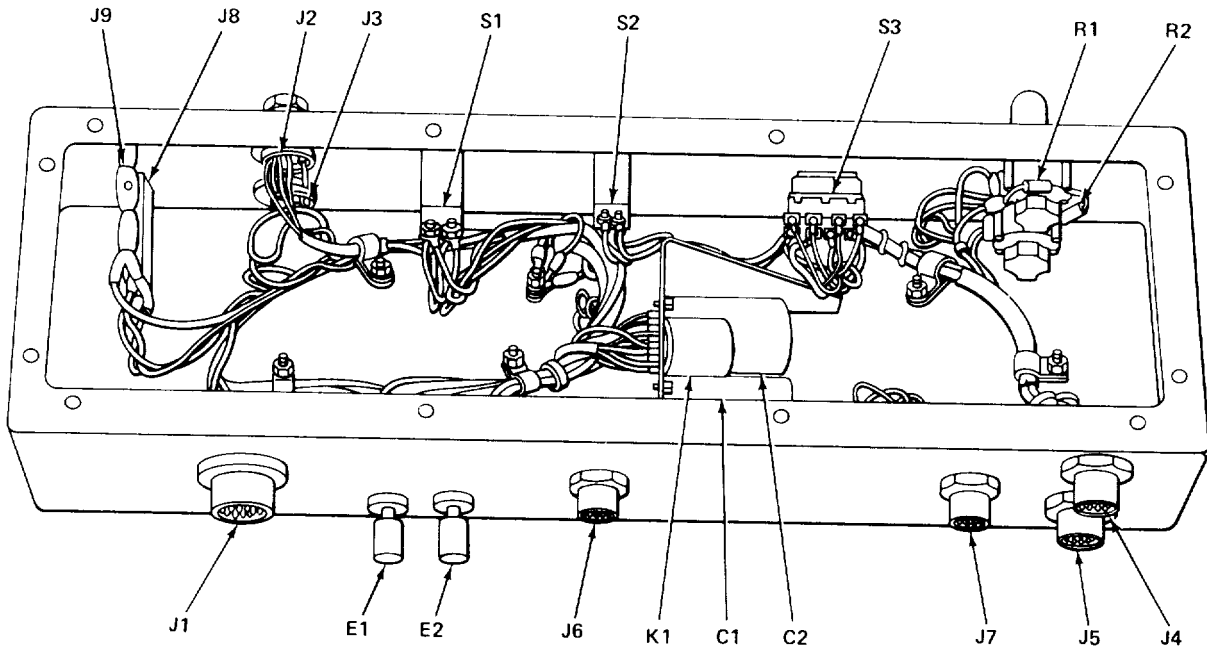
## TEST OR INSPECTION

## CORRECTIVE ACTION

- Step 2. Check continuity of FLUOR LTS switch S4.
- If continuity is not present, replace switch (para 2-33).
- Step 3. Check continuity of AC-OFF-DC switch S1.
- If continuity is not present, repair switch or associated wiring.
13. Cold start lamps do not light when COLD START switch S5 is set to ON. All other lights operate normally.
- Step 1. Check continuity of COLD START switch S5 and associated wiring.
- If continuity is not present, repair or replace switch or associated wiring (para 2-33).
- Step 2. Check for +28 vdc between terminal 10 of TB6 and TB3.
- If +28 vdc is not present, repair or replace switch S1 or associated wiring.
14. All fuel heater does not operate, and GAS HTR indicator lamp lights. All other equipment functions normally.
- Step 1. Check for +28 vdc between pins A and C of heater power input plug.
- If +28 vdc is not present, repair or replace associated wiring.
- Step 2. Bypass thermostat to energize heater.
- a. If heater operates, replace thermostat.
- b. If heater does not operate, troubleshoot heater. See appendix A for applicable TM.
15. All fuel heater does not operate, and GAS HTR indicator lamp does not light. All other equipment operates normally.
- Check for +28 vdc between GAS HTR circuit breaker CB-10 and TB3.
- If +28 vdc is not present, replace circuit breaker (para 2-25).

**2-5. TROUBLESHOOTING SWITCH ASSEMBLY SA-1554/GRC-142 (CONTROL PANEL), AN/GRC-122/142 PLAIN AND C MODELS.**

This procedure isolates a problem to a component of the control panel. See FO-13 for schematic of control panel. Use illustration below to identify parts.



EL6VT038

**TEST PROCEDURE**

1. Remove top cover of control panel.
2. Inspect internal components and repair visible defects.
3. Set controls on control panel as given below:

CONTROLS	SETTING
TEL-REMOTE-CW LOCAL-REMOTE LOCKOUT-OVERRIDE OWR-DX-SEND DX-RCV-PONY	TEL LOCAL LOCKOUT Fully Counterclockwise Fully Counterclockwise

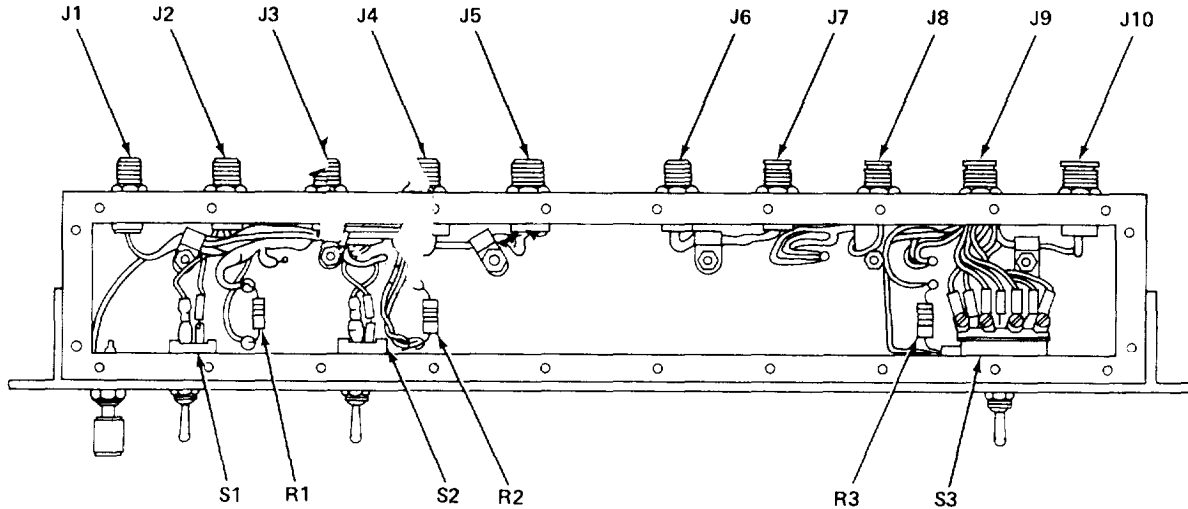
4. Check for 200 resistance between pins A and C of connector J6. If open circuit, relay (solenoid open) K1 is defective,
5. Check for continuity between pin C of connector J1 and + terminal of capacitor C1. If open circuit, relay K1 (contacts 15 and 3 are not making contact) is defective.

## 2-5. TROUBLESHOOTING SWITCH ASSEMBLY SA-15541GRC-142 (CONTROL PANEL), AN/GRC-122/142 PLAIN AND C MODELS. (CONT)

6. Check for continuity between pin C of connector J2 and + terminal of capacitor C2. If open circuit, relay K1 (contacts 15 and 3 are not making contact) is defective.
7. Check that capacitors C1 and C2 are not shorted. (Check for an open circuit across each capacitor).
8. Check for continuity between pin A of connector J7 and terminal 1 of indicator socket XDS1. If open circuit, relay K1 (contacts 16 and 5 are not making contact) is defective,
9. Check for continuity between pin B of connector J7 and terminal 2 of indicator socket XDS1. If open circuit, relay K1 (contacts 18 and 7 are not making contact) is defective.
10. Check for 750 resistance between pins A and C of connector J5. Turn OWR-DX-SEND control R1 from fully counterclockwise to fully clockwise. Resistance should vary from 750 to 0. An open circuit between pins A and C may be caused by defective jack J9, (contacts 1 and 2 or 3 and 4 are not making contact), defective local remote switch S3 (contacts 2 and 3 or 5 and 6 are not making contact), or defective OWR-DX-SEND control R1.
11. Check for 750 resistance between pins A and C of connector J4. Turn DX-RCV-PONY control R2 from fully counterclockwise to fully clockwise. Resistance should vary from 750 to 0. An open circuit between pins A and C of J4 may be caused by defective jack J8 (contacts 1 and 2 or 3 and 4 are not making contact) defective LOCAL-REMOTE switch S3 (contacts 8 and 9 or 11 and 12 are not making contact) or defective DX-RCV-PONY control R2.
12. Set LOCAL-REMOTE switch to REMOTE and, R1 fully counterclockwise.
  - a. Check for 750 resistance between pin C of connector J5, and pin D of connector J7. If open circuit, LOCAL-REMOTE switch (contacts 4 and 5 are not making contact) S3 is defective.
  - b. Check for continuity between pin A of connector J5 and pin C on connector J7. If open circuit, LOCAL-REMOTE switch S3 (contacts 1 and 2 are not making contact) is defective.
13. Set DX-RECEIVE-PONY control fully counterclockwise.
  - a. Check for 750 resistance between pin C of connector J4 and pin F of connector J7. If open circuit, LOCAL-REMOTE switch S3 (contacts 10 and 11 are not making contact) is defective.
  - b. Check for continuity between pin A of connector J4 and pin E of connector J7. If open circuit, LOCAL-REMOTE switch S3 (contacts 7 and 8 are not making contact) is defective.
14. Connect a +28 vdc source between pin C (+) and pin B (-) of connector J6. Set LOCKOUT-OVERRIDE switch to OVERRIDE.
  - a. Check for continuity between pin C of connector J1 and pin C of connector J3. If open circuit, relay K1 did not energize due to defective LOCKOUT-OVERRIDE switch S2 or relay K1 (contacts 14 and 2 or 15 and 4 are not making contact) is defective.
  - b. Check for continuity between terminal E1 and pin A of connector J7. If open circuit, relay K1 (contacts 16 and 6 are not making contact) is defective, or TEL-REMOTE CW switch S1 contacts 2 and 3 are not making contact) is defective.
  - c. Check for continuity between terminal E2 and pin B of connector J7. If open circuit, relay K1 (contacts 18 and 8 are not making contact) is defective, or TEL-REMOTE CW switch S1 (contacts 5 and 6 are not making contact) is defective.
15. Set TEL-REMOTE CW switch to REMOTE CW.
  - a. Check for continuity between pin F of connector J1 and pin A of connector J7. If open circuit, TEL-REMOTE CW switch S1 (contacts 1 and 2 are not making contact) is defective.
  - b. Check for chassis ground at pin B of connector J7. If ground is not present, TEL-REMOTE CW switch S1 (contacts 4 and 5 are not making contact) is defective.

**2-6. TROUBLESHOOTING SWITCH BOX SA-1555/GRC-142, AN/GRC-122/142 PLAIN AND C MODELS.**

This procedure isolates a problem to a component of the switch box. See FO-14 for schematic of switch box. Use illustration below to identify parts.



EL6VT039

**TEST PROCEDURE**

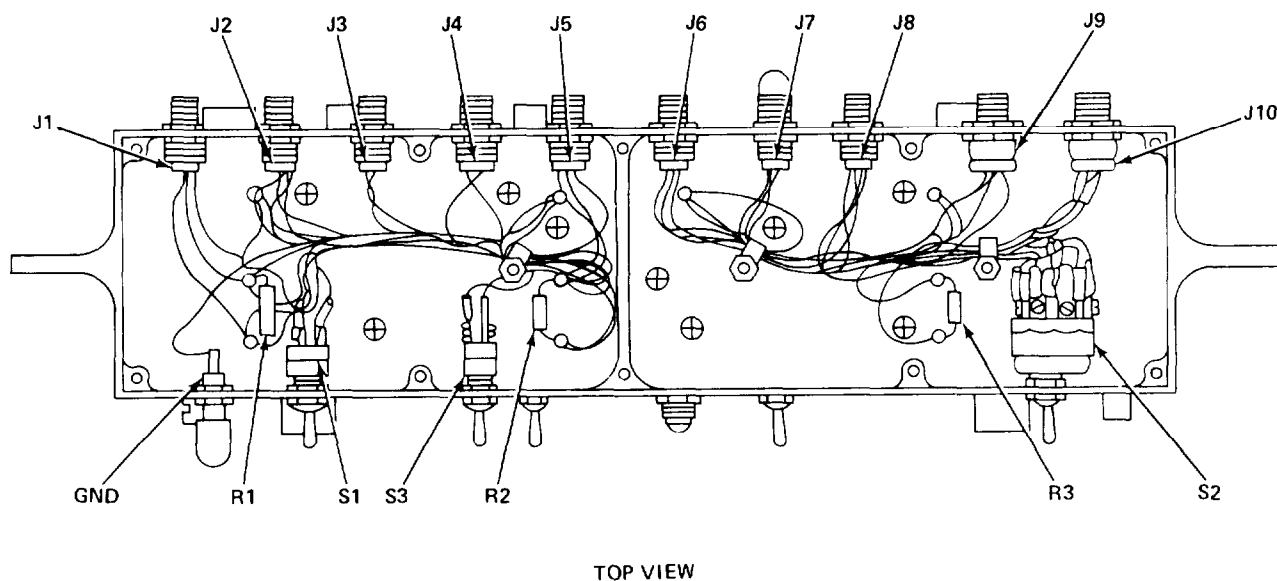
1. Remove top cover of switch box.
2. Inspect internal components and repair visible defects.
3. Set OWR-DX-SEND switch S2 to BLACK. Check for continuity between pin B of connector J1 and pin B of connector J4. If continuity is not present, and the resistance between the two points measures 27K $\Omega$ , OWR-DX-SEND switch S2 is defective.
4. Set OWR-DX-SEND switch to RED. Check for 27K  $\Omega$  resistance between pin B of connector J1 and pin B of connector J4. If an open circuit is present, or the measured resistance differs by more than 5 percent from 27K $\Omega$ , resistor R1 is defective.
5. Set DX-RECEIVE-PONY switch to BLACK. Check continuity between pin B of connector J3 and pin B of connector J5. If continuity is not present and the resistance measures 27K $\Omega$ , DX-RECEIVE-PONY switch S1 is defective.
6. Set DX-RECEIVE-PONY switch to RED. Check for 27K $\Omega$  resistance between pin B of connector J3 and pin B of connector J5. If an open circuit is present, or the measured resistance differs by more than 5 percent from 27K $\Omega$ , resistor R2 is defective.
7. Set TAPE PUNCH switch to OWR-DX-SEND.
  - a. Check for continuity between pin C of connector J7 and pin B of connector J8. If open circuit, TAPE PUNCH switch S3 (contacts 11 and 12 are not making contact) is defective.
  - b. Check continuity between pin C of connector J8 and pin C of connector J10. If open circuit, TAPE PUNCH switch S3 (contacts 2 and 3 are not making contact) is defective.

## 2-6. TROUBLESHOOTING SWITCHBOX SA-1555/GRC-142, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)

8. Set TAPE PUNCH switch to DX-RECEIVE.
  - a. Check for continuity between pin B of connector J6 and pin C of connector J8. If open circuit, TAPE PUNCH switch S3 (contacts 1 and 2 are not making contact) is defective.
  - b. Check for continuity between pin B of connector J8 and pin B of connector J9. If open circuit, TAPE PUNCH switch S3 (contacts 10 and 11 are not making contact) is defective.
  - c. Check for  $68\ \Omega$  resistance between pin C of connector J7 and pin C of connector J10. If open circuit, TAPE PUNCH switch S3 (contacts 4 and 5 or 7 and 8 are not making contact) is defective.

## 2-7. TROUBLESHOOTING SWITCH ASSEMBLY SA-1650/GRC, AN/GRC-122/142A, B, D, AND E MODELS.

This procedure isolates a problem to a component of the switch assembly. See FO-14 for schematic of switch assembly. Use illustrations below to identify parts.



EL6VT040

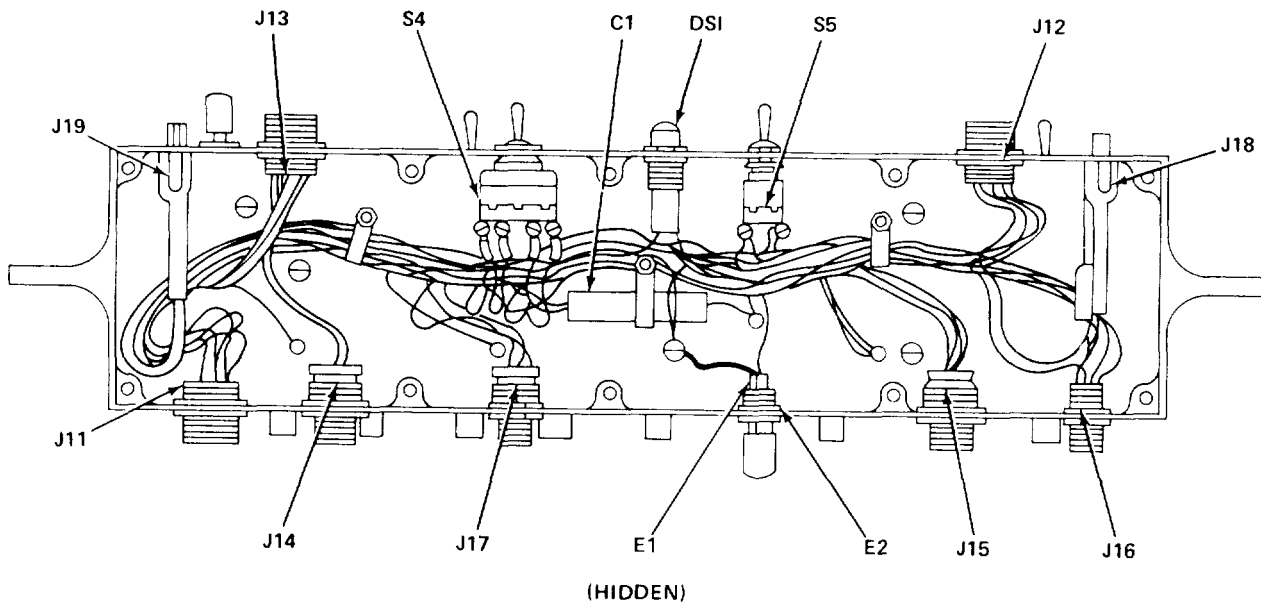
### TEST PROCEDURE

1. Remove top and bottom covers from switch assembly.
2. Perform a visual inspection of internal components and repair defects.
3. Set OWR-DX-SEND switch S2 to BLACK. Check for continuity between pin B of connector J1 and pin B of connector J4. If continuity is not present and the resistance measures  $27K\Omega$ , OWR-DX-SEND switch is defective.
4. Set OWR-DX-SEND switch S2 to RED. Check for  $27K\Omega$  resistance between pin B of connector J1 and pin B of connector J4. If an open circuit is present or measured resistance differs by more than 5 percent from  $27K\Omega$ , resistor R1 is defective.

2-7. TROUBLESHOOTING SWITCH ASSEMBLY SA-1650/GRC, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)

TEST PROCEDURE (CONT)

5. Set DX-RECEIVE-PONY switch S1 to BLACK. Check for continuity between pin B of connector J3 and pin B of connector J5. If continuity is not present and the resistance measures  $27K\Omega$ , DX-RECEIVE-PONY switch S1 is defective.
6. Set DX-RECEIVE-PONY switch S2 to RED. Check for  $27K\Omega$  resistance between pin B of connector J3 and pin B of connector J5. If an open circuit is present or measured resistance differs by more than 5 percent from  $27K\Omega$ , resistor R2 is defective.
7. Set TAPE PUNCH switch S3 to OWR-DX-SEND.
  - a. Check for continuity between pin C of connector J7 and pin B of connector J8. If open circuit, TAPE PUNCH switch S3 (contacts 11 and 12 are not making contact) is defective.
  - b. Check for continuity between pin C of connector J8 and pin C of connector J10. If open circuit, TAPE PUNCH switch S3 (contacts 2 and 3 are not making contact) is defective.



EL6VT041



**2-7. TROUBLESHOOTING SWITCH ASSEMBLY SA-1650/GRC, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)**

8. Set TAPE PUNCH switch S3 to DX-RECEIVE.
  - a. Check for continuity between pin B of connector J6 and pin C of connector J8. If open circuit, TAPE PUNCH switch S3 (contacts 1 and 2 are not making contact) is defective.
  - b. Check for continuity between pin B of connector J8 and pin B of connector J9. If open circuit, TAPE PUNCH switch S3 (contacts 10 and 11 are not making contact) is defective.
  - c. Check for 68S2 resistance between pin C of connector J7 and pin C of connector J10. If open circuit, TAPE PUNCH switch S3 (contacts 4 and 5 or 7 and 8 are not making contact) is defective.
9. With LOCKOUT-OVERRIDE switch S5 in its normal LOCKOUT position, check for continuity between pin B of connector J16 and pin C of connector J12. If open circuit, LOCKOUT-OVERRIDE switch S5 (contacts 1 and 2 are not making contact) is defective.
10. Hold LOCKOUT-OVERRIDE switch S5 in OVERRIDE position.
  - a. Check for continuity between pin B of connector J17 and pin C of connector J16. If open circuit, LOCKOUT-OVERRIDE switch S5 (contacts 5 and 6 are not making contact) is defective.
  - b. Check for continuity between pin A of connector J16 and pin C of connector J12. If open circuit, LOCKOUT-OVERRIDE switch S5 (contacts 3 and 2 are not making contact) is defective.
11. Check capacitor C1 as follows:
  - a. Ensure that LOCKOUT-OVERRIDE switch is in LOCKOUT position.
  - b. Place a multimeter positive (+) probe on pin C of connector J11 and negative (-) probe on pin C of connector J13. With multimeter range switch set at its highest resistance range, the meter pointer will move toward infinity as capacitor C1 charges up. A short circuit, low resistance reading, or an open circuit indicates that capacitor C1 is defective.
12. Set LOCAL-REMOTE switch to LOCAL.
  - a. Check for continuity between pins C and A of connector J14. If open circuit, either connector J18 (open contacts) is defective, or LOCAL-REMOTE switch S4 (contacts 11 and 12 or 8 and 9 are not making contact) is defective.
  - b. Check for continuity between pins C and A of connector J15. If open circuit, either connector J19 (open contacts) is defective, or LOCAL-REMOTE switch S4 (contacts 5 and 6 or 2 and 3 are not making contact) is defective.
13. Set LOCAL-REMOTE switch S4 to REMOTE.
  - a. Check for continuity between pin C of connector J14 and pin F of connector J17. If open circuit, either connector J18 (open contacts) is defective, or LOCAL-REMOTE switch S4 (contacts 11 and 10 are not making contact) is defective.

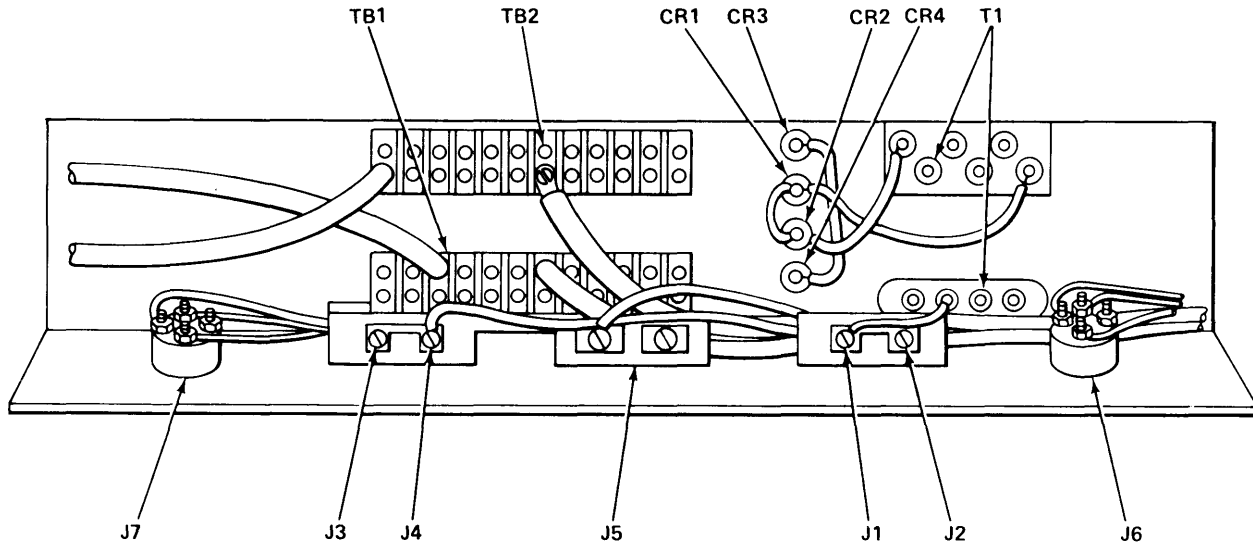
**2-7. TROUBLESHOOTING SWITCH ASSEMBLY SA-1650/GRC, AN/GRC-122/142A, B, D, AND E MODELS. (CONT)**

TEST PROCEDURE (CONT)

- b. Check for continuity between pin A of connector J14 and pin E of connector J17. If open circuit, LOCAL-REMOTE switch S4 (contacts 7 and 8 are not making contact) is defective.
- c. Check for continuity between pin C of connector J15 and pin D of connector J17. If open circuit, either connector J19 (open contacts) is defective, or LOCAL-REMOTE switch S4 (contacts 5 and 4 are not making contact) is defective.
- d. Check for continuity between pin A of connector J15 and pin C of connector J17. If open circuit, LOCAL-REMOTE switch S4 (contacts 2 and 1 are not making contact) is defective.

**2-8. TROUBLESHOOTING POWER TERMINAL ASSEMBLY, AN/GRC-122/142A, B, D, AND E MODELS.**

The power terminal assembly is handwired into the shelter. It is therefore more practical to troubleshoot this unit while it is installed in the shelter. This procedure isolates a problem to a component of the power terminal assembly. See FO-16 for schematic of power terminal assembly. Use illustration below to identify parts.



EL6VT042

**2-8. TROUBLESHOOTING POWER TERMINAL ASSEMBLY, AN/GRC-122/142A, B, D, AND E MODELS.**

TEST PROCEDURE

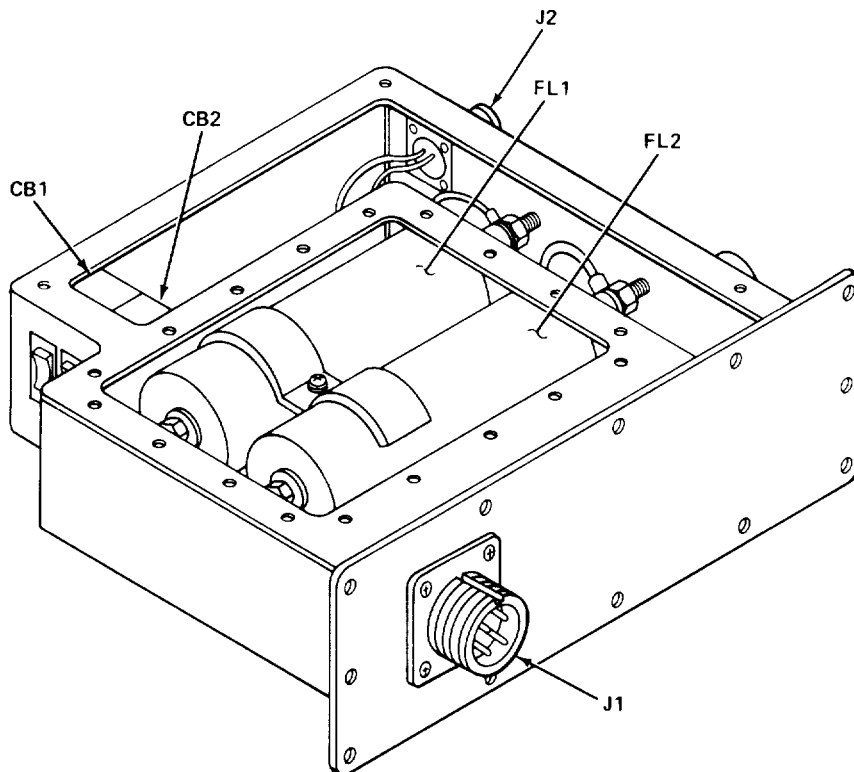
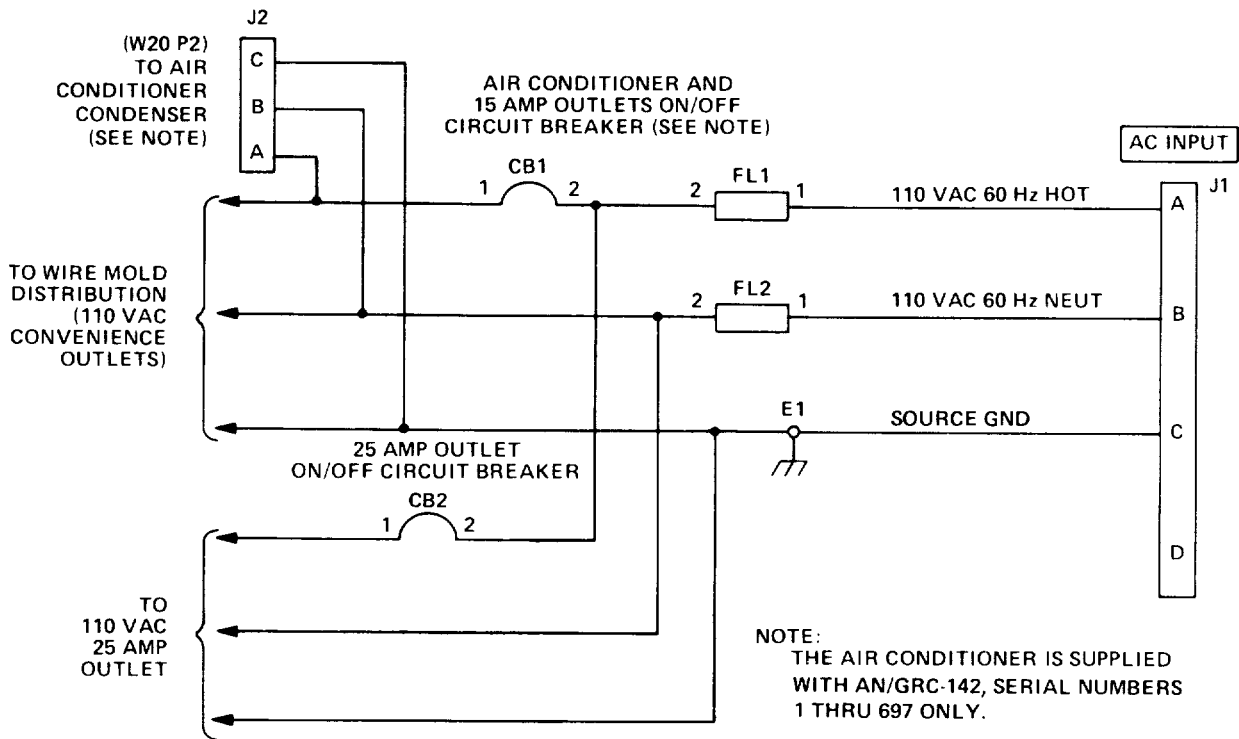
1. Perform a visual inspection of internal components and repair defects.
2. Check continuity between terminals 1, 2, 3, and 4 of transformer T1. If no continuity, transformer T1 is defective.
3. Check continuity between terminals 5, 6, 7, 8, 9, and 10 of transformer T1. If no continuity, transformer T1 is defective.
4. Unsolder wires from terminals 6 and 10 of transformer T1. Measure ac voltage across terminals 6 and 10 of transformer T1; nominal voltage measured should be 32 vac. If a nominal voltage is not obtained, transformer is defective.
5. Resolder wires to terminals 6 and 10 of transformer T1 and measure dc voltage at cathode terminal of diode CR1. Voltage should be nominal 35 vdc. If a nominal voltage is not obtained, diode rectifier bridge circuit is defective. Measure forward and backward resistance of each diode in bridge circuit to isolate defective diode.

**2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX.**

The ac and dc entrance boxes, ac/dc distribution box, interconnecting box, remote control, and power/signal entrance box do not contain electronic components. Isolate trouble in any of these units by referring to its schematic diagram listed below and performing appropriate continuity checks. Remove appropriate panels to gain access to components for testing.

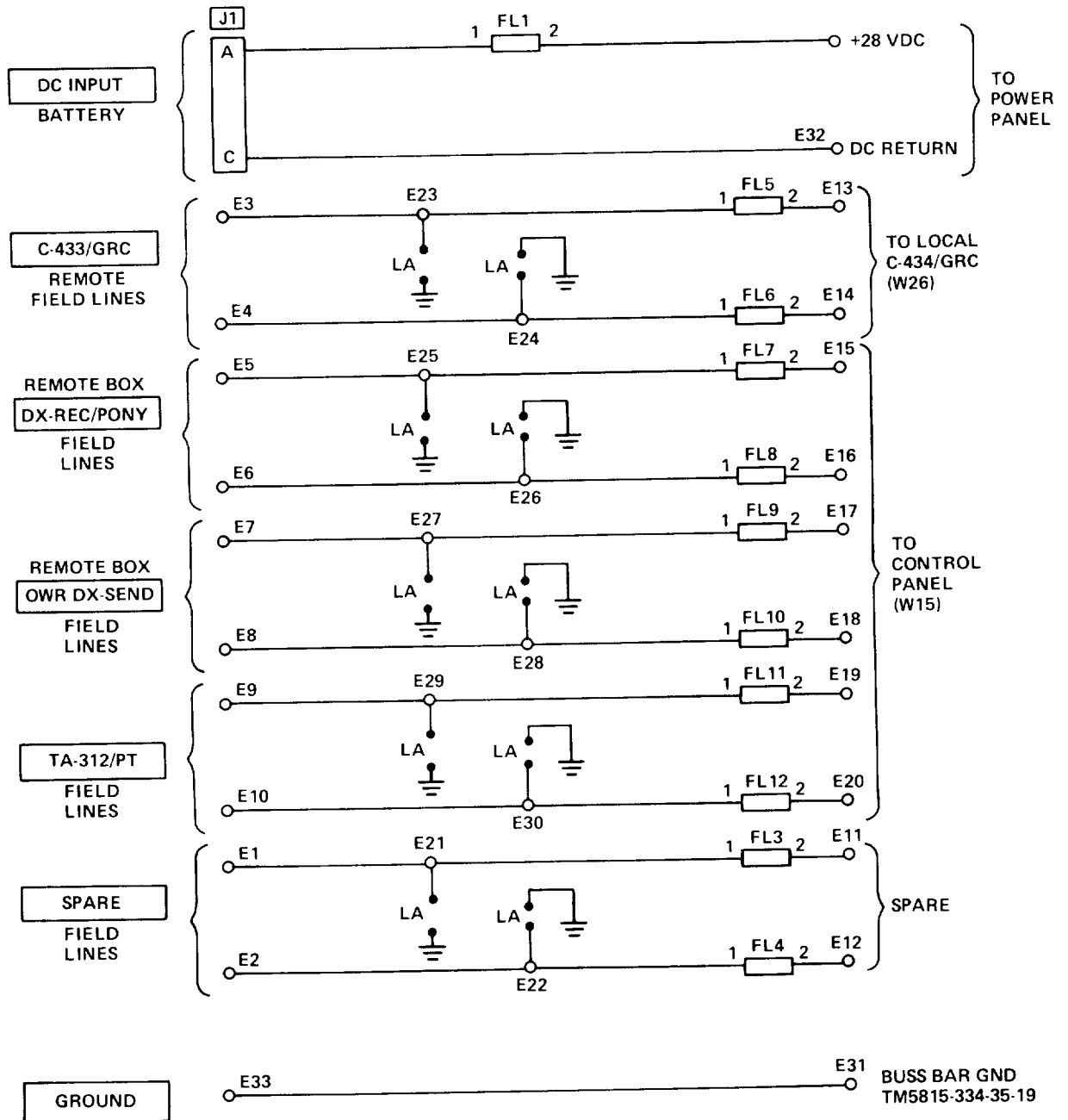
COMPONENT	SCHEMATIC DIAGRAM
AC Entrance Box DC Entrance Box Remote Control C-7279/GRC-142 Interconnecting Box J-2728/GRC-142 AC/DC Distribution Box Power/Signal Entrance Box	Page 2-32 Page 2-34 Page 2-35 Page 2-36 Page 2-37 Page 2-38

2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)

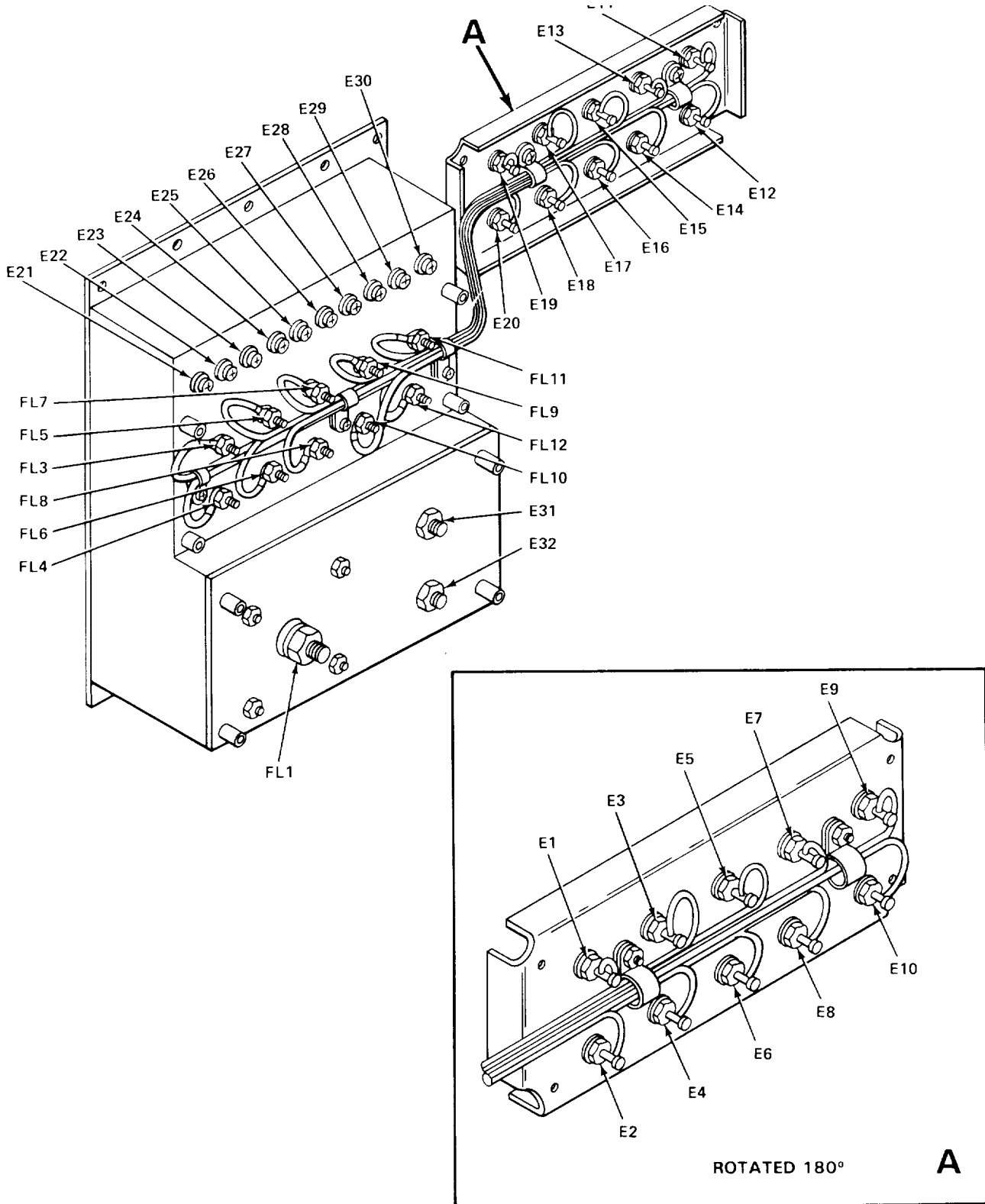


EL6VT043

2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)

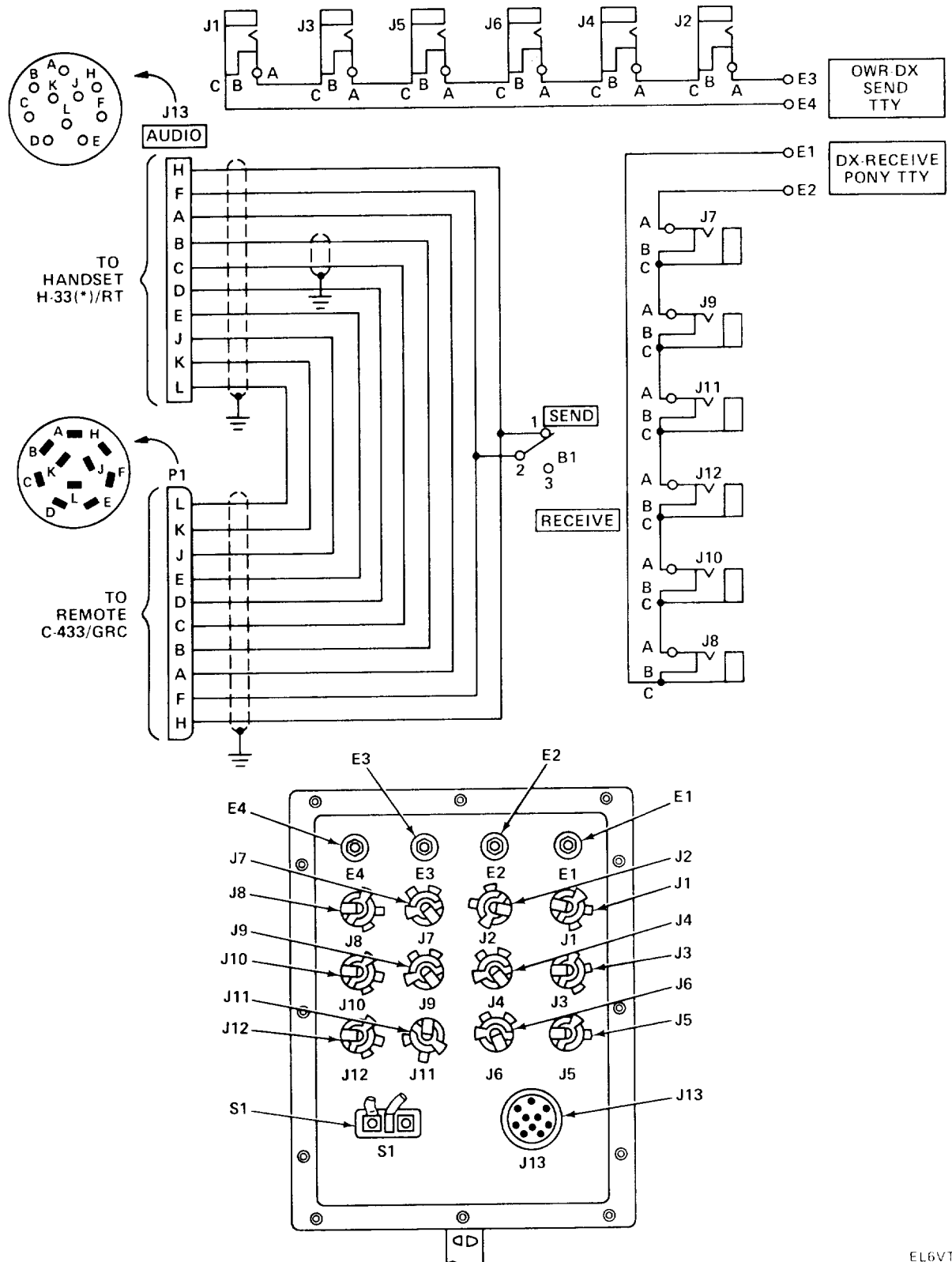


2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)



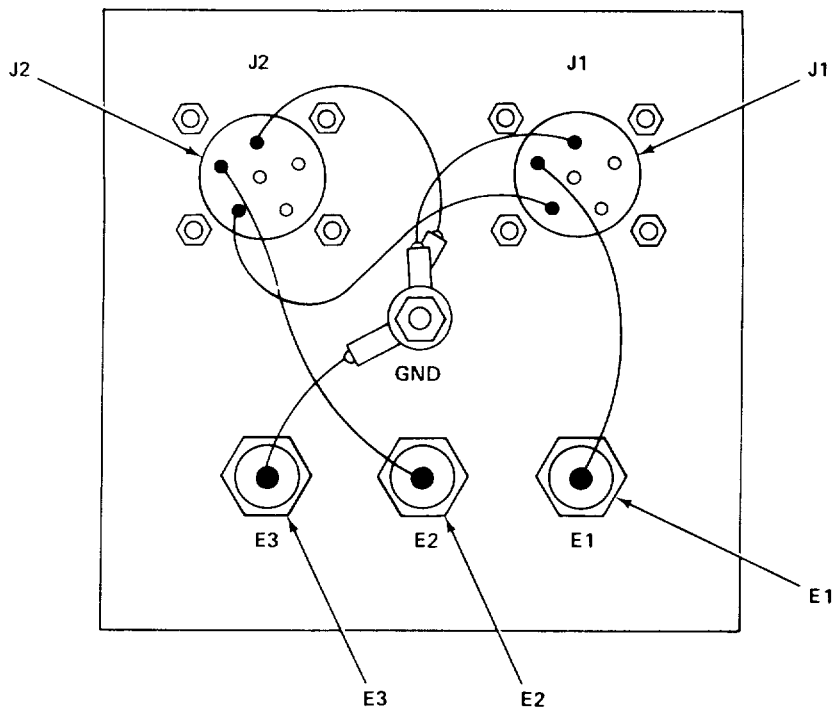
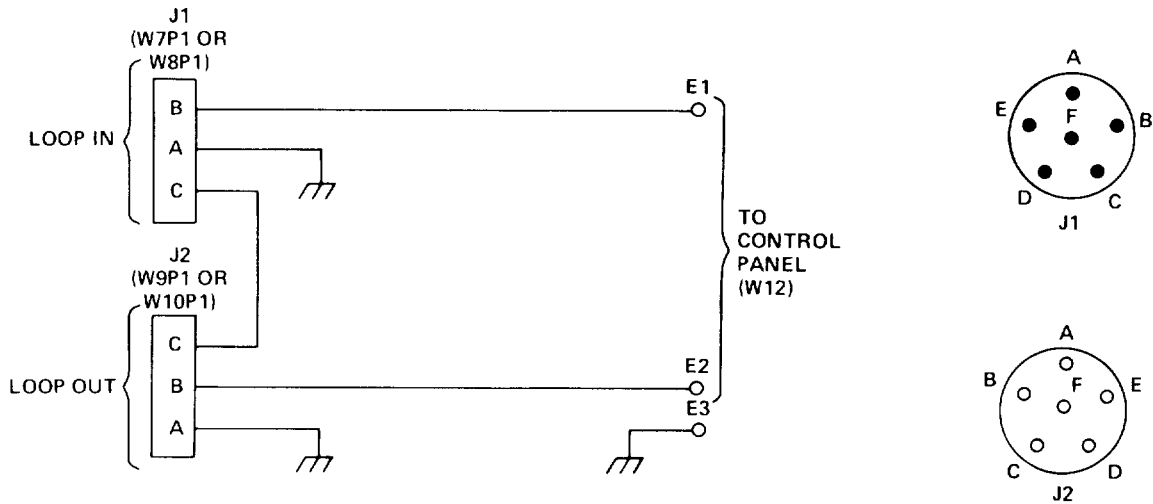
EL6VT045

2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/G RC-142, REMOTE CONTROL C-7279/GRC-142, AN D POWER/SIGNAL ENTRANCE BOX. (CONT)



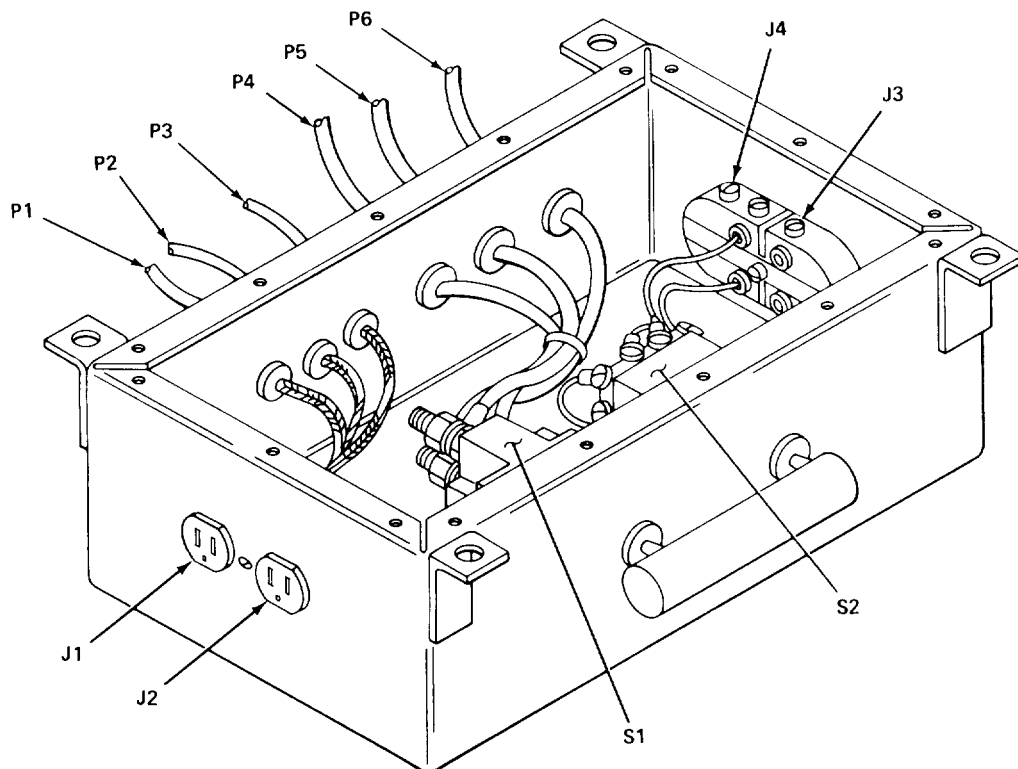
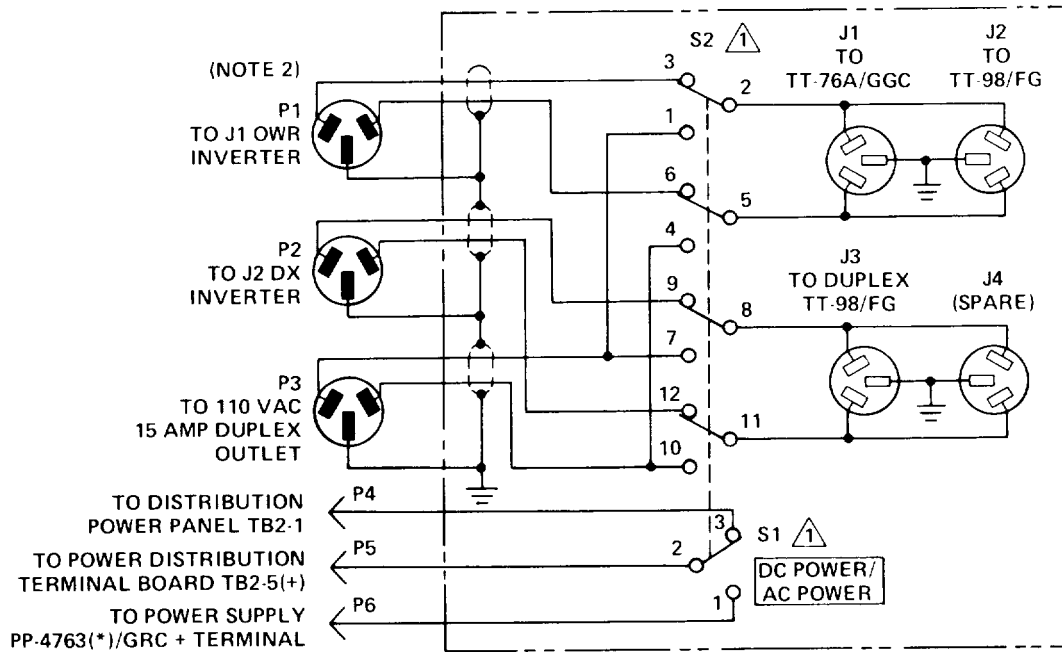
EL6VT046

2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)





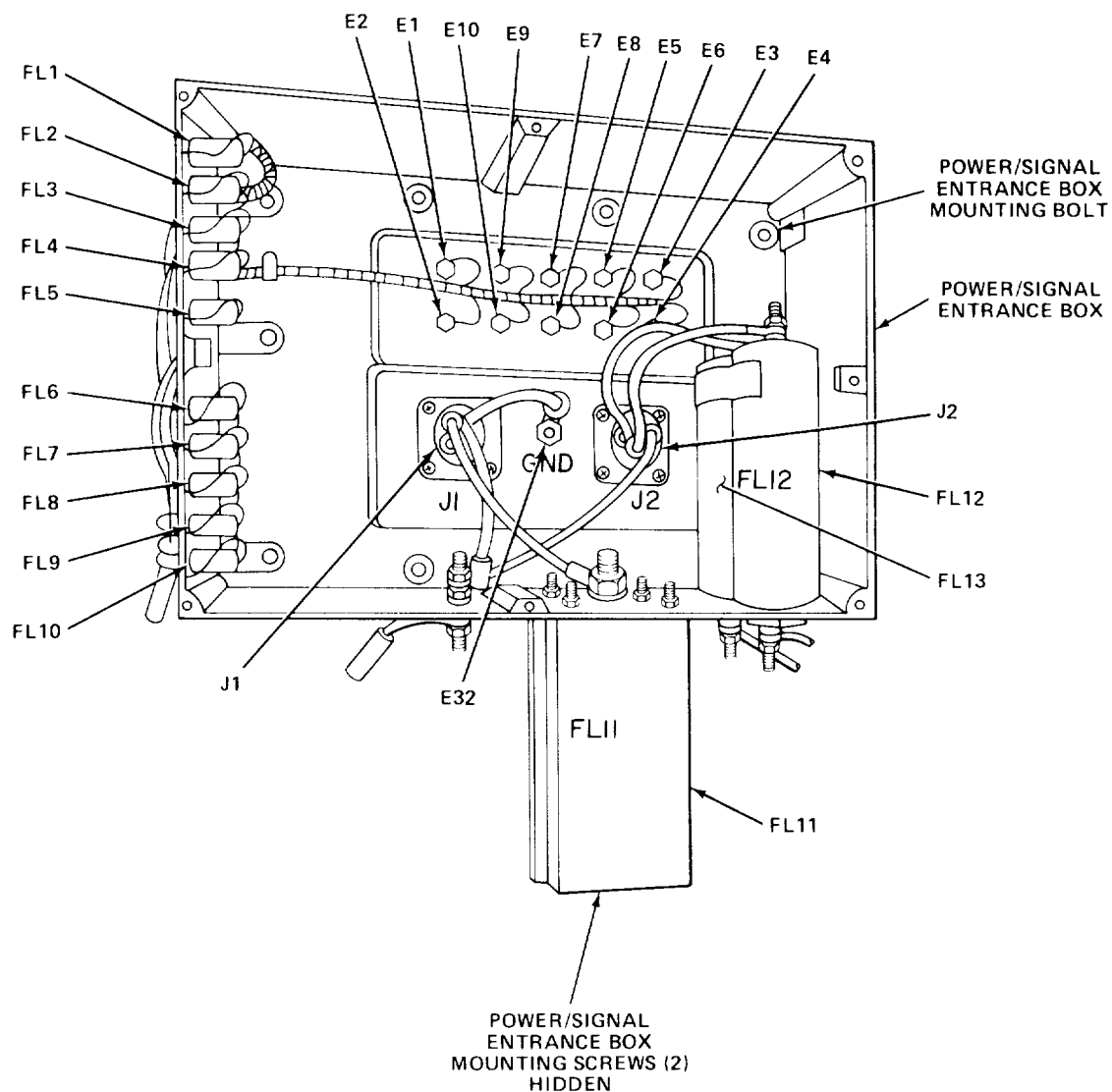
2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)



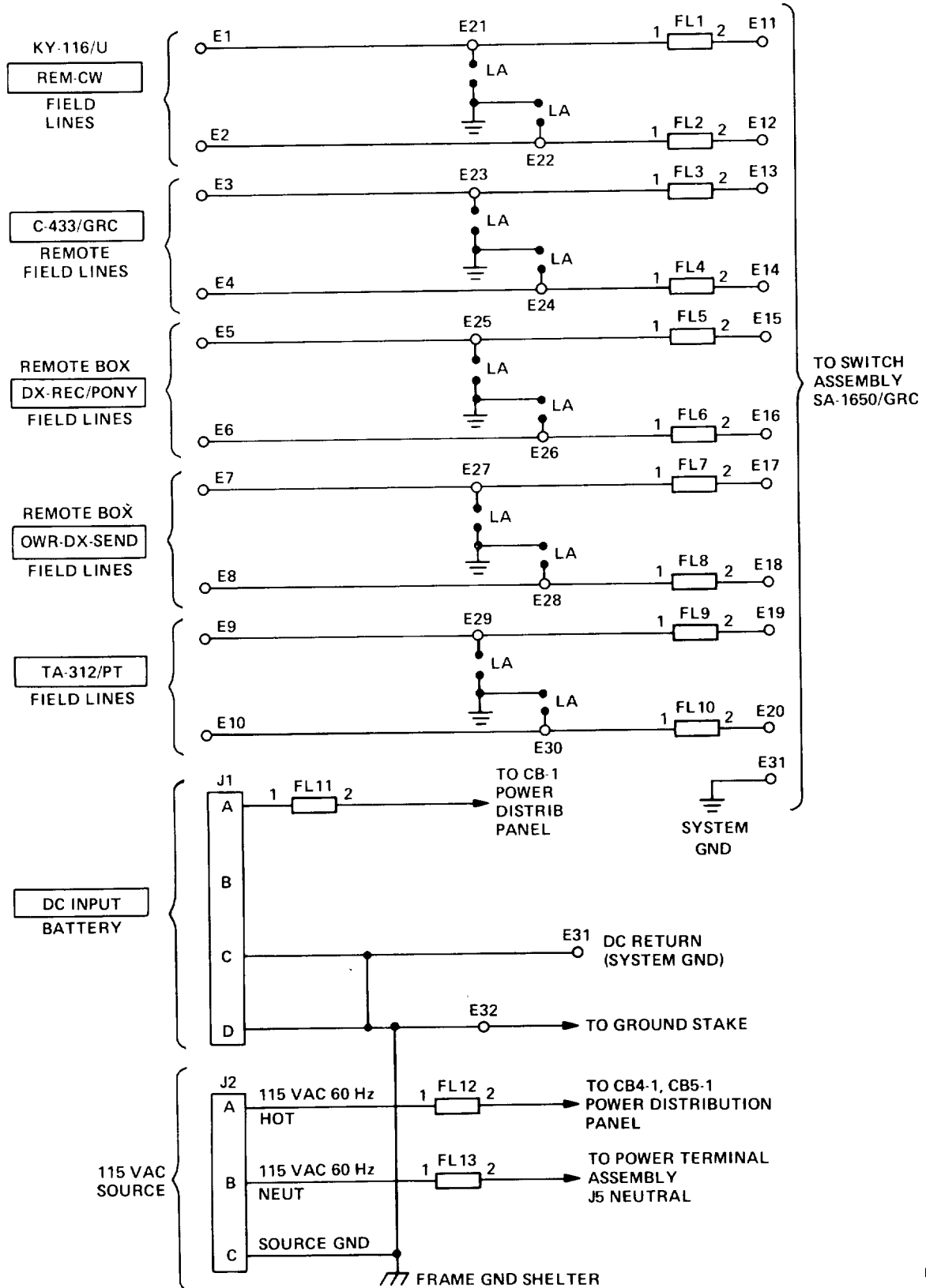
- NOTES:
1. SWITCHES SHOWN IN [DC POWER] POSITION
  2. P1, P2, AND P3 REFER TO PENDANT PLUGS TERMINATING INDICATED CABLES. P4, P5, AND P6 REFER TO LUGS TERMINATING INDICATED CABLES.

EL6VT048

2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)



2-9. TROUBLESHOOTING AC AND DC ENTRANCE BOXES, AC/DC DISTRIBUTION BOX, INTERCONNECTING BOX J-2728/GRC-142, REMOTE CONTROL C-7279/GRC-142, AND POWER/SIGNAL ENTRANCE BOX. (CONT)

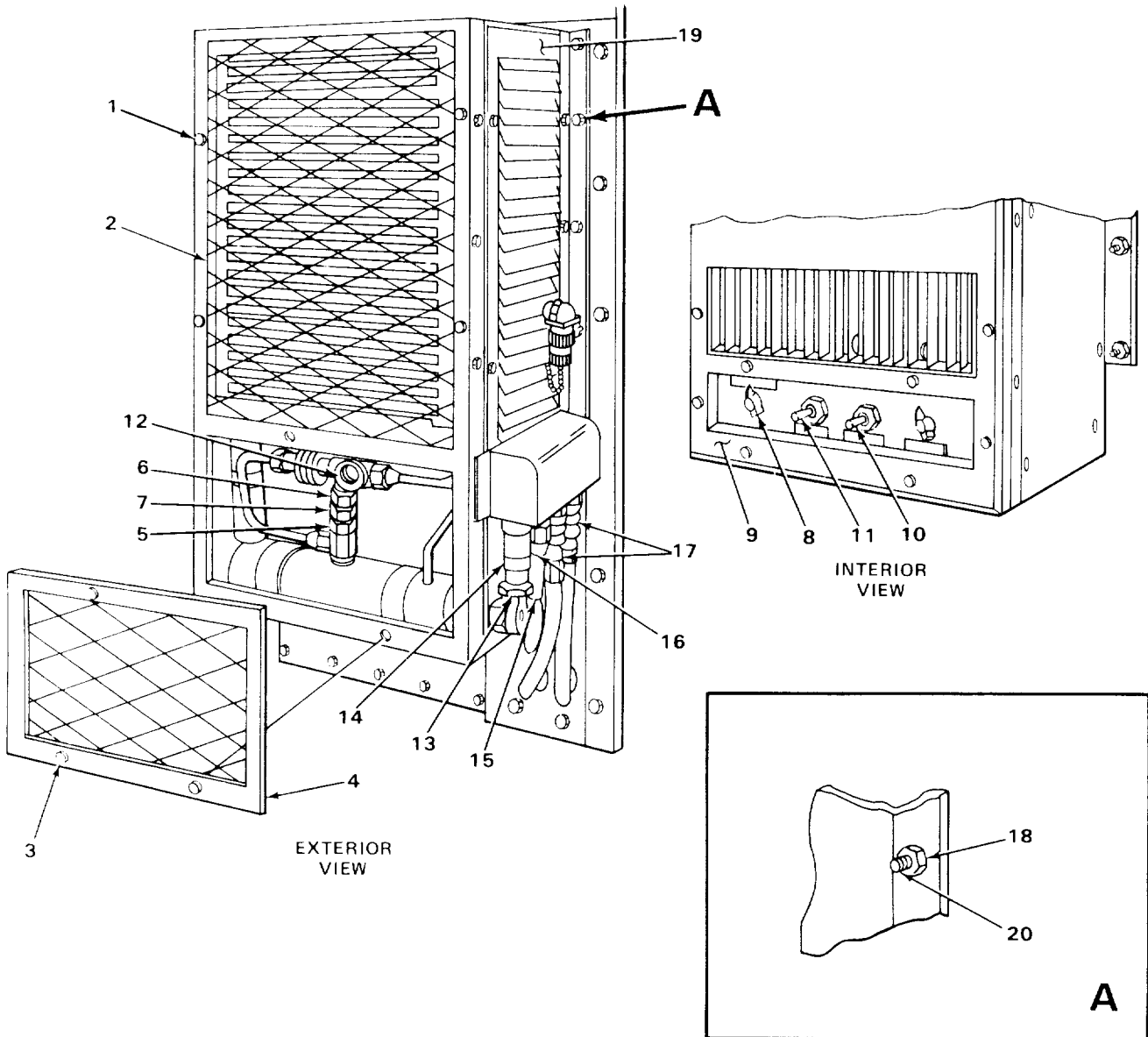






2-11. AIR CONDITIONER REPLACEMENT, AN/G RC-142 (SERIAL NUMBERS 1 THROUGH 697 ONLY).

The air conditioner is installed in AN/GRC-142 models (serial numbers 1 through 697 only). Located on the curbside rear wall of shelter, the air conditioner is made up of two components: an evaporator and a condenser, Perform condenser or evaporator replacement procedures as given below:



EL6VT051

CONDENSER REMOVAL

1. Set air conditioner circuit breaker on ac entrance box to OFF.
2. Remove four screws (1) from shroud (2).
3. Remove shroud (2).
4. Loosen three turn lock fasteners (3) and remove grille (4).

**2-11. AIR CONDITIONER REPLACEMENT, AN/GRC-142 (SERIAL NUMBERS 1 THROUGH 697 ONLY). (CONT)**

5. Remove valve cap (5) from refrigerant receiver valve (6).
6. Turn valve stem (7) fully clockwise.
7. Replace and tighten valve cap (5).
8. Set air conditioner circuit breaker to ON.
9. Turn switch SW4 (8) on evaporator (9) to its coldest setting.
10. Turn switch SW3 (10) on evaporator (9) to COOL.
11. Turn switch SW2(11) on evaporator (9) to ON.

**NOTE**

Observe sight glass (12) for bubbles. Set air conditioner circuit breaker to OFF when bubbles and liquid almost disappear.

12. Disconnect power cable (13) from receptacle P (14).
13. Disconnect interconnecting cable (15) from receptacle I (16).
14. Replace grille (4) and tighten turn lock fasteners (3).

**CAUTION**

Do not allow fittings on condenser to turn during disconnection. Possible damage may occur if fittings are not removed properly. Use two wrenches, one to hold the fitting stationary on condenser, and the other to loosen and remove hose coupling. Avoid twisting and kinking hoses and do not allow dirt to enter hose couplings; damage may occur.

15. Tag and disconnect two refrigerant hoses (17) from couplings marked S and D on condenser.
16. Remove 11 nuts (18) that secure condenser (19) to shelter wall.
17. With assistance of another technician, remove condenser (19) from shelter wall, keeping it upright at all times.

**CONDENSER REPLACEMENT**

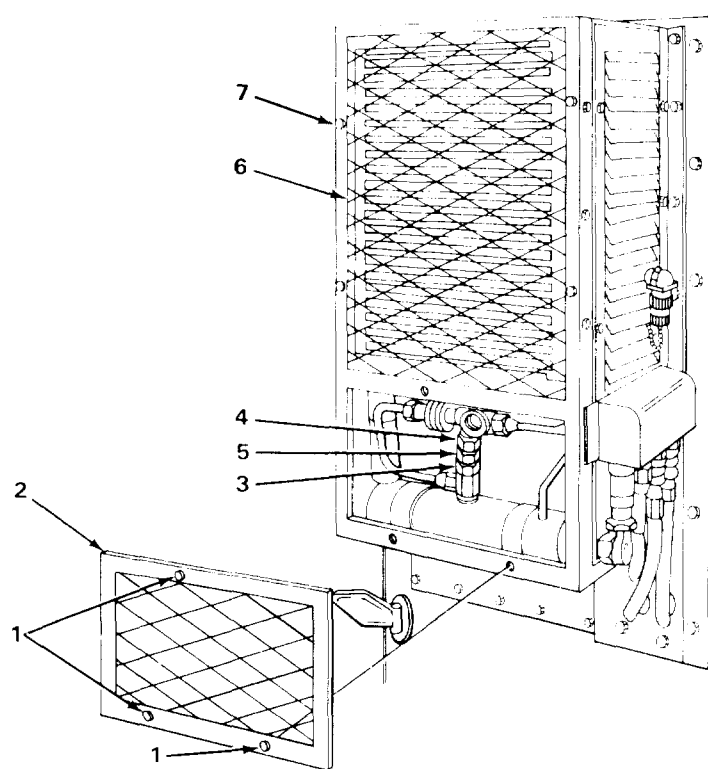
1. Position condenser (19) over bolts (20) on shelter wall.
2. Secure condenser (19) to shelter wall with 11 nuts (18).

**CAUTION**

Do not allow fittings on condenser to turn during connection. Possible damage may occur if fittings are not removed properly. Use two wrenches, one to hold the fitting stationary on condenser, and the other to loosen and remove hose coupling. Avoid twisting and kinking hoses and do not allow dirt to enter hose couplings, damage may occur.

3. Connect larger refrigerant hose (17) to fitting marked S.
4. Connect smaller refrigerant hose (17) to fitting marked D.
5. Connect power cable (13) to receptacle P (14).
6. Connect interconnecting cable (15) to receptacle (16).

2-11. AIR CONDITIONER REPLACEMENT, AN/GRC-142 (SERIAL NUMBERS 1 THROUGH 697 ONLY). (CONT)



EL6VT052

7. Loosen three turn lock fasteners (1) and remove grille (2).
8. Remove valve cap (3) from refrigerant receiver valve (4).
9. Turn valve stem (5) fully counterclockwise.
10. Replace and tighten valve cap (3).
11. Replace grille (2) and tighten turn lock fasteners (1).
12. Place shroud (6) over condenser and secure with four screws (7).

EVAPORATOR REMOVAL

**CAUTION**

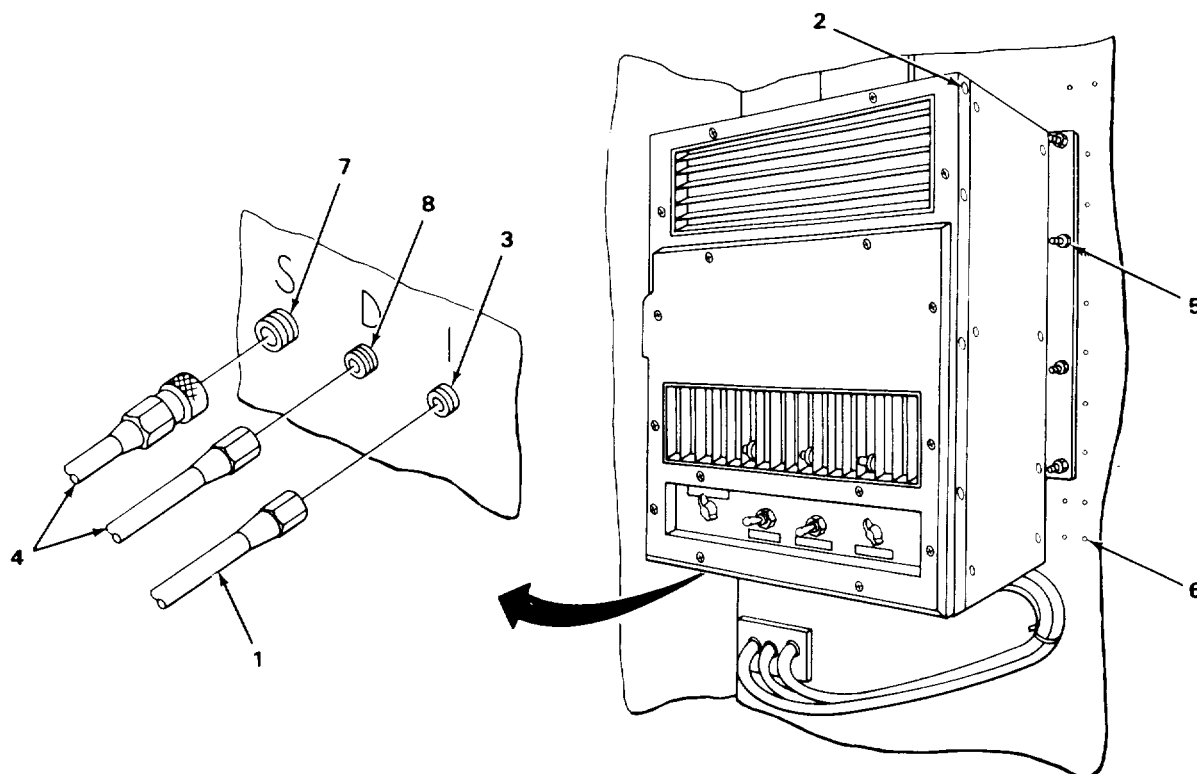
Do not allow fittings on evaporator to turn during disconnection. Possible damage may occur if fittings are not removed properly. Use two wrenches, one to hold the fitting stationary on condenser, and the other to loosen and remove hose coupling. Avoid twisting and kinking hoses and do not allow dirt to enter hose couplings, damage may occur.

**NOTE**

If condenser and evaporator are not to be replaced together, perform steps 1 through 12 of condenser replacement. If they are being replaced together, proceed to step 1.



2-11. AIR CONDITIONER REPLACEMENT, AN/GRC-142 (SERIAL NUMBERS 1 THROUGH 697 ONLY). (CONT)



1. Tag and disconnect interconnecting cable (1) from evaporator unit (2) and receptacle I (3).
2. Tag and disconnect two refrigerant hoses (4).
3. Remove eight nuts (5) that secure evaporator unit (2) to shelter wall (6).
4. Remove evaporator unit (2).

EVAPORATOR REPLACEMENT

1. Position evaporator unit (2) on shelter wall (6).
2. Secure evaporator unit (2) with eight nuts (5).

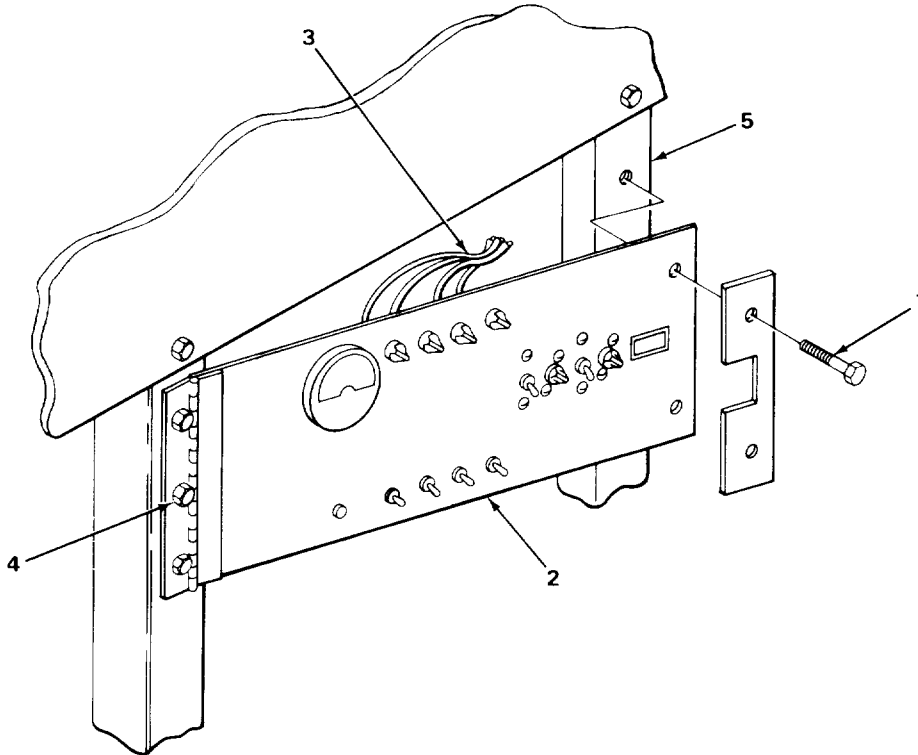
**CAUTION**

Do not allow fittings on evaporator to turn during connection. Possible damage may occur if fittings are not removed properly. Use two wrenches, one to hold the fitting stationary on condenser, and the other to loosen and remove hose coupling. Avoid twisting and kinking hoses and do not allow dirt to enter hose couplings, damage may occur.

3. Connect larger refrigerant hose (4) to fitting marked S (7).
4. Connect smaller refrigerant hose (4) to fitting marked D (8).
5. Connect interconnecting cable (1) to receptacle marked I (3).
6. Perform steps 7 through 12 of condenser replacement.

2-12. POWER DISTRIBUTION PANEL SB-3018/GRC REPLACEMENT, AN/GRC-122/142 PLAIN AND C MODELS.

MATERIALS/PARTS: Power Distribution Panel SB-3018/GRC



EL6VT054

**WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

REMOVAL

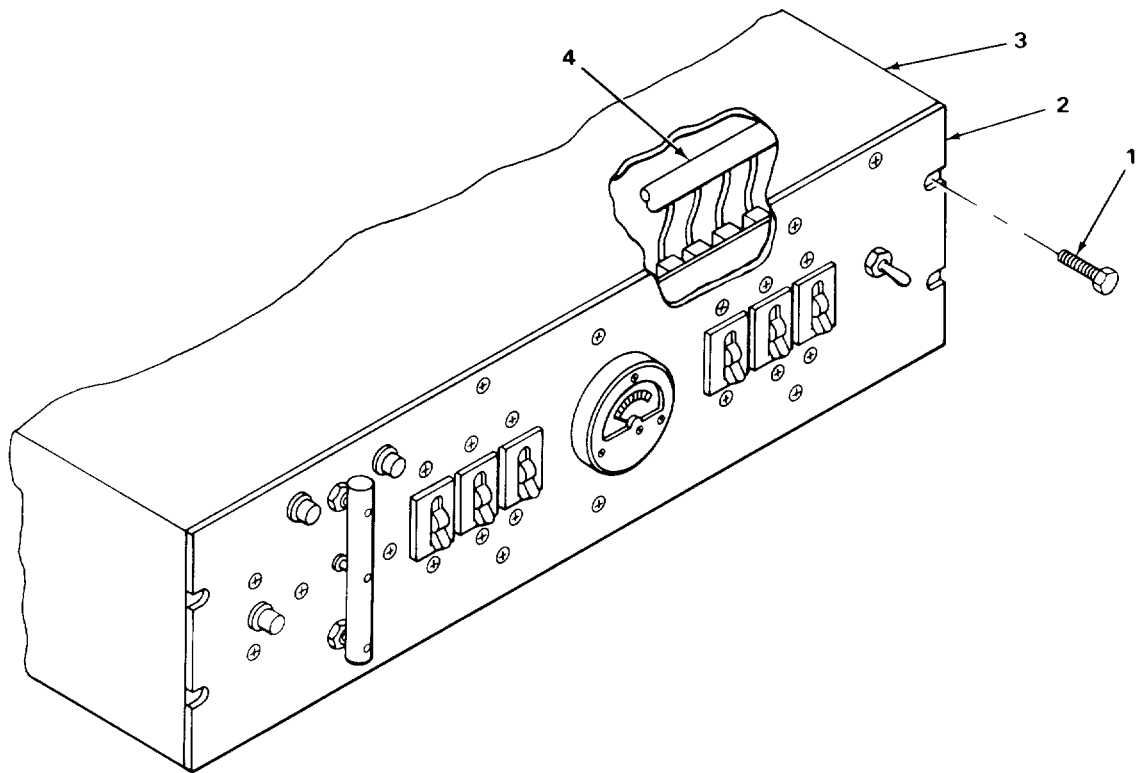
1. Remove two bolts (1) from SB-3018/GRC (2).
2. Swing SB-3018/GRC (2) to left.
3. Tag and disconnect all external wires (3).
4. Remove three bolts (4) from SB-3018/GRC (2).
5. Remove SB-3018/GRC (2).

INSTALLATION

1. Place SB-3018/GRC (2) on shelf (5) and secure with two bolts (4).
2. Connect all external wires (3) to their terminals.
3. Swing SB-3018/GRC (2) to right.
4. Secure SB-3018/GRC (2) with two bolts (1).

## 2-13. POWER DISTRIBUTION PANEL SB-3358/GRC REPLACEMENT, AN/GRC-122/142A AND B MODELS.

MATERIALS/PARTS: Power Distribution Panel SB-3358/GRC



EL6VT055

### REMOVAL

#### **WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

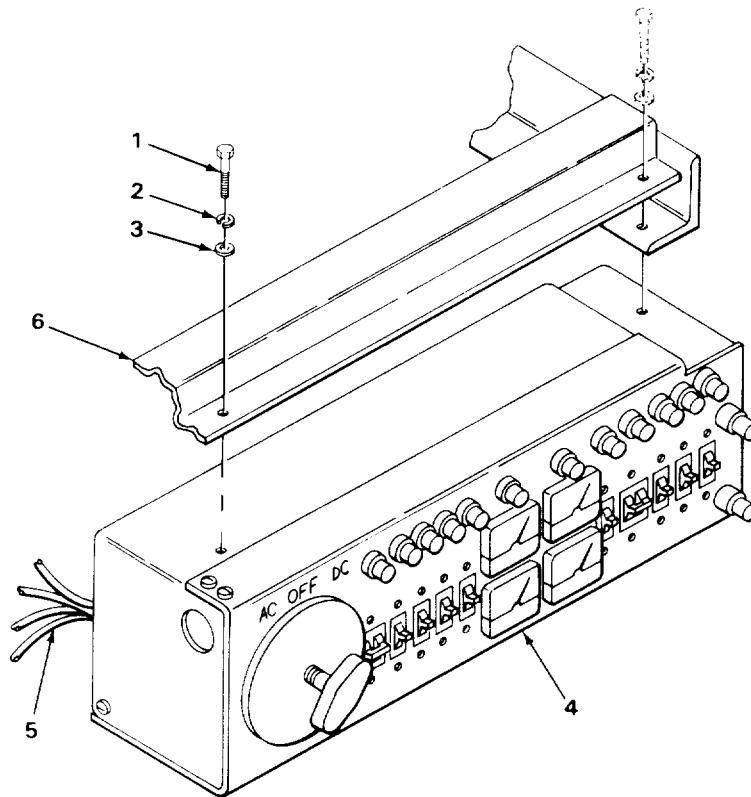
1. Remove four screws (1) from SB-3358/GRC (2).
2. Pull SB-3358/GRC (2) forward from shelf (3).
3. Tag and disconnect all external cables (4) from SB-3358/GRC (2).
4. Remove SB-3358/GRC (2) from shelf (3).

### INSTALLATION

1. Place SB-3358/GRC (2) near shelf (3).
2. Connect all external cables (4) to SB-3358/GRC (2) as tagged.
3. Install SB-3358/GRC (2) to shelf (3) with four screws (1).

2-14. POWER DISTRIBUTION PANEL SC-F-960672 REPLACEMENT, AN/GRC-122/142D AND E MODELS.

MATERIALS/PARTS: Power Distribution Panel SC-F-960672



EL6VT056

REMOVAL

**WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

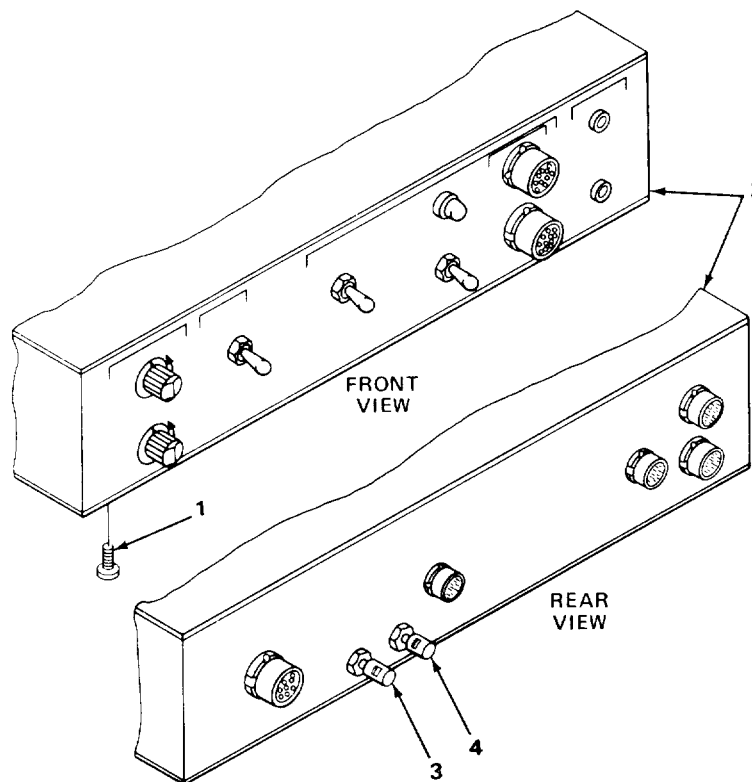
1. Remove six screws (1), lockwashers (2), and flat washers (3).
2. Pull SC-F-960672 (4) forward.
3. Tag and disconnect all external cables (5).
4. Remove SC-F-960672 (4) from shelf (6).

INSTALLATION

1. Place SC-F-960672 (4) near shelf (6).
2. Connect all cables (5) to SC-F-960672 (4) as tagged.
3. Install SC-F-960672 (4) to shelf (6) with six screws (1), lockwashers (2), and flat washers (3).

**2-15. CONTROL PANEL REPLACEMENT, AN/GRC-122/142 PLAIN AND C MODELS.**

MATERIALS/PARTS: Control Panel SA-1554/GRC



EL6VT057

**REMOVAL****WARNING**

To avoid severe shock to personnel, set MAIN circuit breaker on power distribution panel to OFF before replacing control panel.

1. Tag and disconnect all external cords and cables from front panel.
2. Loosen four screws (1) on control panel (2).
3. Pull control panel (2) forward to gain access to rear connectors.
4. Tag and disconnect wires from E1 (3) and E2 (4).
5. Tag and disconnect all cables connected to rear of control panel (2).
6. Remove control panel (2).

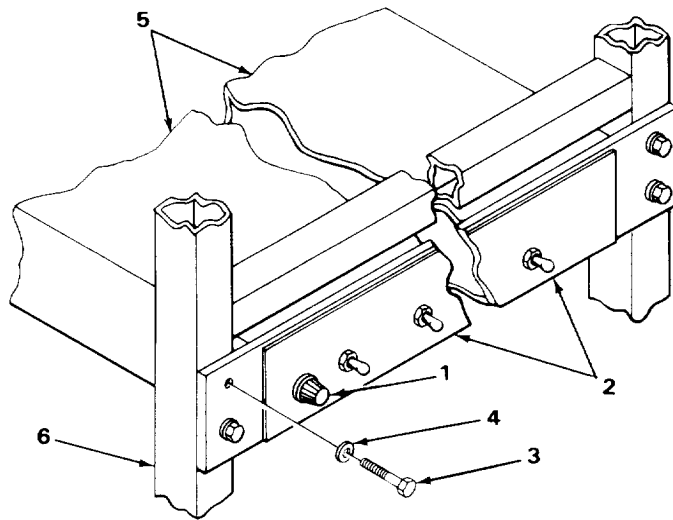
## 2-15. CONTROL PANEL REPLACEMENT, AN/GRC-122/142 PLAIN AND C MODELS. (CONT)

### INSTALLATION

1. Connect all tagged cables to appropriate connectors on rear of control panel (2).
2. Connect tagged wires to E1(3) and E2(4) connectors on rear of control panel (2).
3. Secure control panel (2) in place with four screws (1).
4. Connect all tagged external cords and cables to appropriate connectors on front panel.

## 2-16. SWITCH BOX REPLACEMENT AN/GRC-122/142 PLAIN AND C MODELS.

MATERIALS/PARTS: Switch Box SA-1555/GRC



EL6VT058

### **WARNING**

To avoid severe shock to personnel, set MAIN circuit breaker on power distribution panel to OFF before replacing switch box.

### REMOVAL

1. Disconnect wire from CHASSIS GRD terminal (1) on front panel (2).
2. Remove four screws (3) and lockwashers (4) that secure switch box (5) to equipment rack (6).
3. Pull switch box (5) forward.
4. Tag and remove all cables from rear of switch box (5).
5. Remove switch box (5).

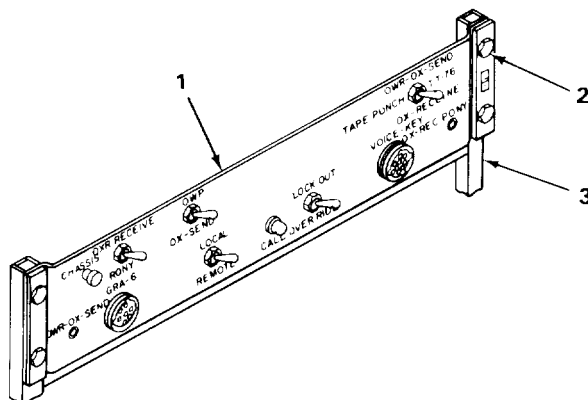
### INSTALLATION

1. Connect all tagged cables to appropriate connectors on rear of switch box (5).
2. Secure unit to equipment rack (6) with four screws (3) and lockwashers (4).
3. Connect appropriate wire to CHASSIS GRD terminal (1) on front panel (2).

**2-17. SWITCH ASSEMBLY REPLACEMENT, AN/GRC-122/142A, B, D, AND E MODELS.**

MATERIALS/PARTS: Switch Assembly SA-1650/GRC

PRELIMINARY PROCEDURES: Remove TT-98/FG. (Refer to TM 11-5815-334-20.)



EL6VT059

**WARNING**

To avoid severe shock to personnel, set AC MAIN and DC MAIN circuit breakers on power distribution panel to OFF before replacing switch assembly.

**REMOVAL**

1. Tag and disconnect all external cords and cables from front panel of switch assembly (1).
2. Remove four bolts (2) that secure switch assembly (1) to equipment rack (3).
3. Pull switch assembly (1) forward.
4. Tag and disconnect all cables connected to rear of switch assembly (1).
5. Remove switch assembly (1).

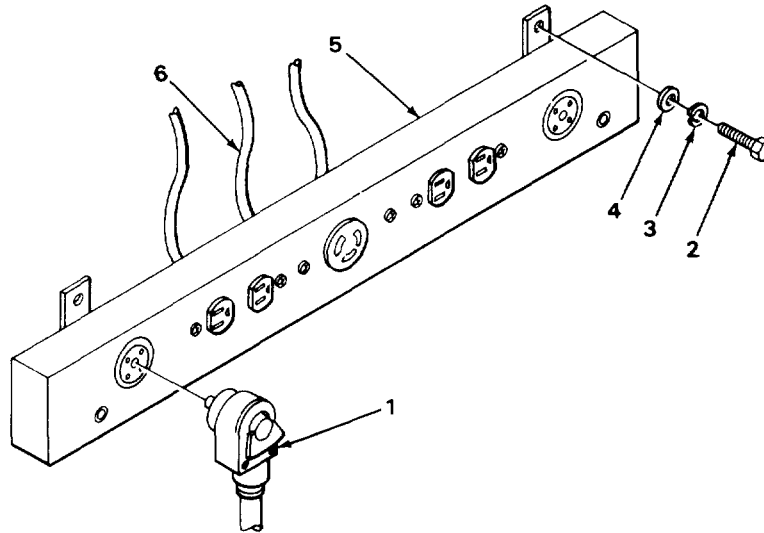
**INSTALLATION**

1. Connect all tagged external cords and cables to appropriate rear panel connectors.
2. Secure switch assembly (1) to equipment rack (3) with four screws (2).
3. Connect all tagged external cords and cables to appropriate front panel (1) connectors.

**2-18. POWER TERMINAL ASSEMBLY REPLACEMENT, ANIGRC-122/142A, B, D, AND E MODELS.**

MATERIALS/PARTS: Power terminal assembly

PRELIMINARY PROCEDURES: Remove TT-98(\*)/FG (AN/GRC-122/142A and E models).  
Remove AN/UGC-74A(V)3 (AN/GRC-122/142D and E models).  
(Refer to TM 11-5815-334-20.)



EL6VT060

**WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

**REMOVAL**

1. Tag and disconnect all external cables (1).
2. Remove two screws (2), lockwashers (3), and flat washers (4) from power terminal assembly (5).
3. Pull power terminal assembly (5) forward.
4. Tag and disconnect all connecting wires (6).
5. Remove power terminal assembly (5).

**INSTALLATION**

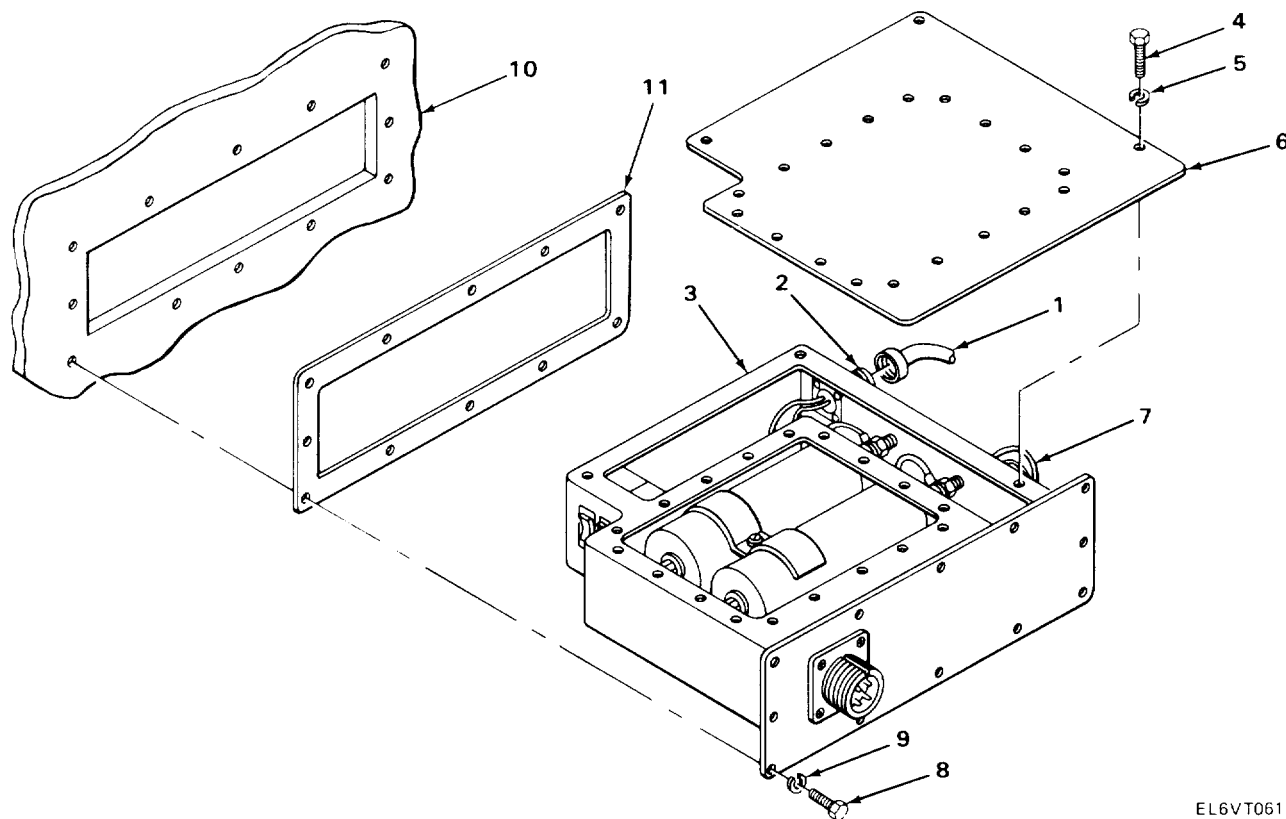
1. Place power terminal assembly (5) near mounting area.
2. Connect all wires (6) to power terminal assembly (5) as tagged.
3. Using two screws (2), lockwashers (3), and flat washers (4), install power terminal assembly to wall.
4. Install cables (1) as tagged.



**2-19. AC ENTRANCE BOX REPLACEMENT, AN/GRC-122/142 PLAIN AND C MODELS.**

MATERIALS/PARTS: Gasket  
Ac entrance box

PRELIMINARY PROCEDURES: Remove power cable.



EL6VT061

**REMOVAL****WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

1. Remove cable W20 (1) from J2 (2) of ac entrance box (3).
2. Remove 21 screws (4), lockwashers (5), and cover (6).
3. Tag and disconnect wires (7).
4. From outside shelter, remove twelve screws (8) and lockwashers (9).
5. Pull AC ENTRANCE BOX (3) from shelter (10).
6. Remove gasket (11).

**INSTALLATION**

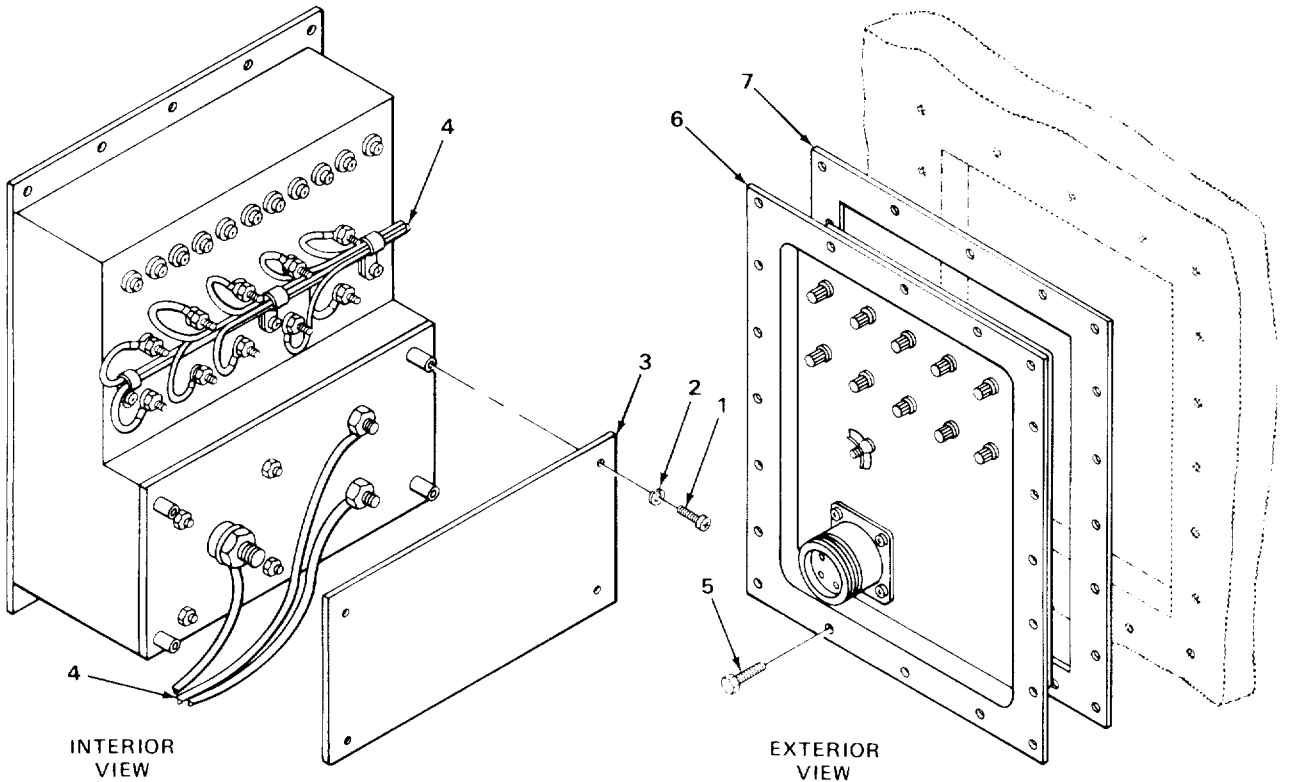
1. Install gasket (11).
2. Install ac entrance box (3) using twelve screws (8) and lockwashers (9).
3. Install wires (7) to ac entrance box as tagged.
4. Install cable W20 (1).
5. Using 21 screws (4) and lockwashers (5), install cover (6).

**2-20. DC ENTRANCE BOX REPLACEMENT, AN/GRC-122/142 PLAIN AND C MODELS.**

MATERIALS/PARTS: Gasket

Dc entrance box

PRELIMINARY PROCEDURE: Remove power cable, ground strap, and field wires.



EL6VT062

**REMOVAL**

**WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

1. From inside of shelter, remove four screws (1), lockwashers (2), and cover (3).
2. Tag and disconnect all external wires (4).
3. From outside of shelter, remove 20 screws (5).
4. Remove dc entrance box (6).
5. Remove gasket (7).

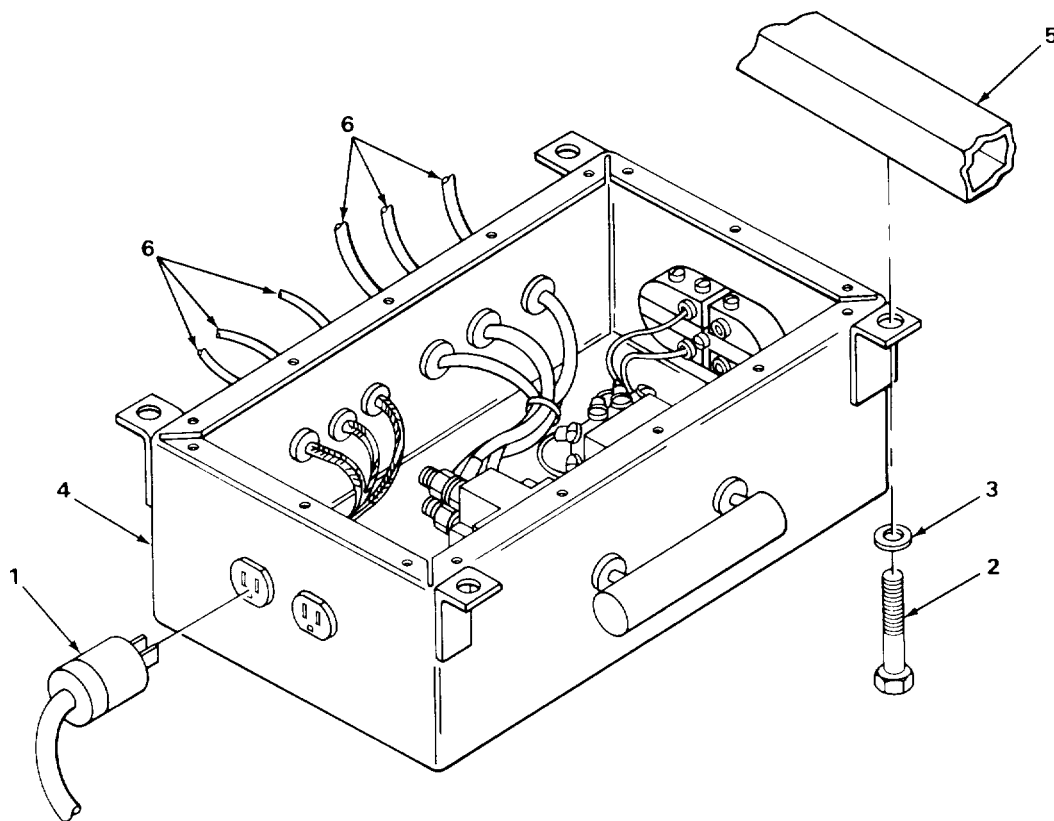
**INSTALLATION**

1. Install gasket (7).
2. Using 20 screws (5), install dc entrance box (6).
3. From inside shelter, connect all wires (4) as tagged.
4. Using four screws (1) and lockwashers (2), install cover (3).

## 2-21. AC/DC DISTRIBUTION BOX J-2776/GRC REPLACEMENT, AN/GRC-122/142 PLAIN AND C MODELS.

MATERIALS/PARTS: Ac/dc distribution box

PRELIMINARY PROCEDURE: Remove power cable.



EL6VT063

### REMOVAL

### WARNING

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

1. Remove all plugs (1) from receptacles.
2. Remove four screws (2) and lockwashers (3) and lower ac/dc distribution box (4) from mounting (5).
3. Tag and disconnect all wires (6).
4. Remove ac/dc distribution box (4).

### INSTALLATION

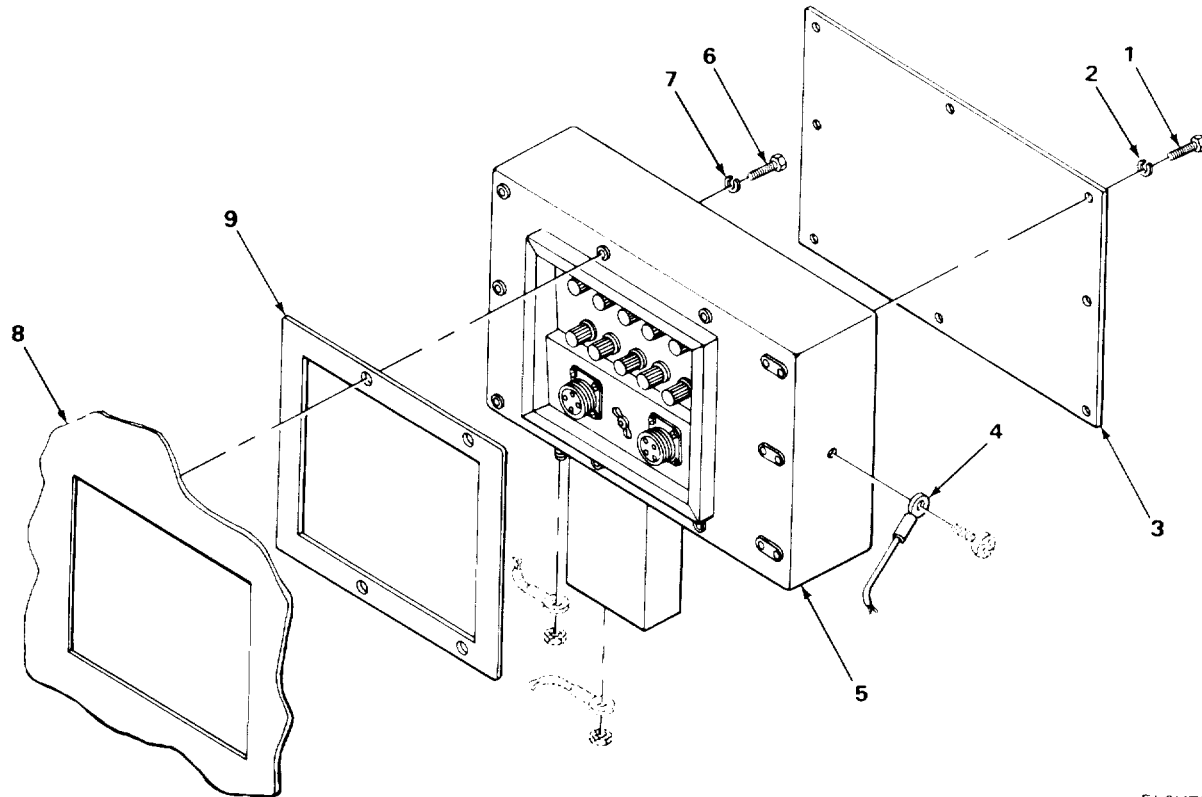
1. Place ac/dc distribution box (4) near mounting.
2. Install wires (6) as tagged.
3. Using four screws (2) and lockwashers (3), install ac/dc distribution box (4) to mounting.
4. Install all plugs (1) into their associated receptacle.

**2-22. POWER/SIGNAL ENTRANCE BOX REPLACEMENT, AN/GRC-122/142A, B, D, AND E MODELS.**

MATERIALS/PARTS: Gasket

Power/signal entrance box

PRELIMINARY PROCEDURE: Remove ac and dc power cable.



EL6VT064

**REMOVAL**

**WARNING**

Disconnect shelter from its ac or dc power source to prevent possible electrocution.

1. Remove eight screws (1), lockwashers (2) and cover (3).
2. Tag and disconnect all external wires (4) from power/signal entrance box (5).
3. Remove nine screws (6) (AN/GRC-122/142B and E models) or 10 screws (6) (AN/GRC-122/142A and D models) and lockwashers (7).
4. Remove power/signal entrance box (5) from shelter (8).
5. Remove gasket (9).

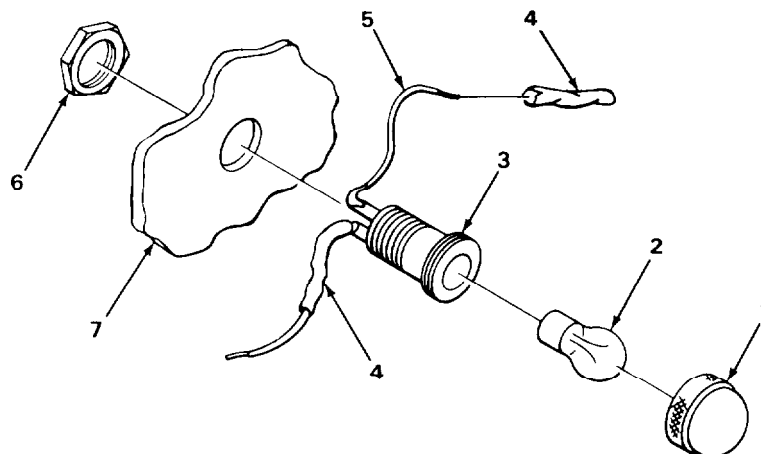
**INSTALLATION**

1. Install gasket (9).
2. Using nine screws (6) and lockwashers (7), install power/signal entrance box (5) into shelter (8).
3. Install all wires (4) to power/signal entrance box as tagged.
4. Using eight screws (1) and lockwashers (2), install cover (3).

## 2-23. LAMPHOLDER REPLACEMENT.

This procedure covers removal of a typical lampholder from switch box, switch assembly, control panel, or power distribution panels. Procedures may vary slightly between components.

MATERIALS/PARTS: Shrink tubing



EL6VT065

### REMOVAL

1. Remove lens cap (1) and lamp (2) from lampholder (3).

### CAUTION

Before soldering or unsoldering, familiarize yourself with TB SIG-222 to prevent possible damage to equipment.

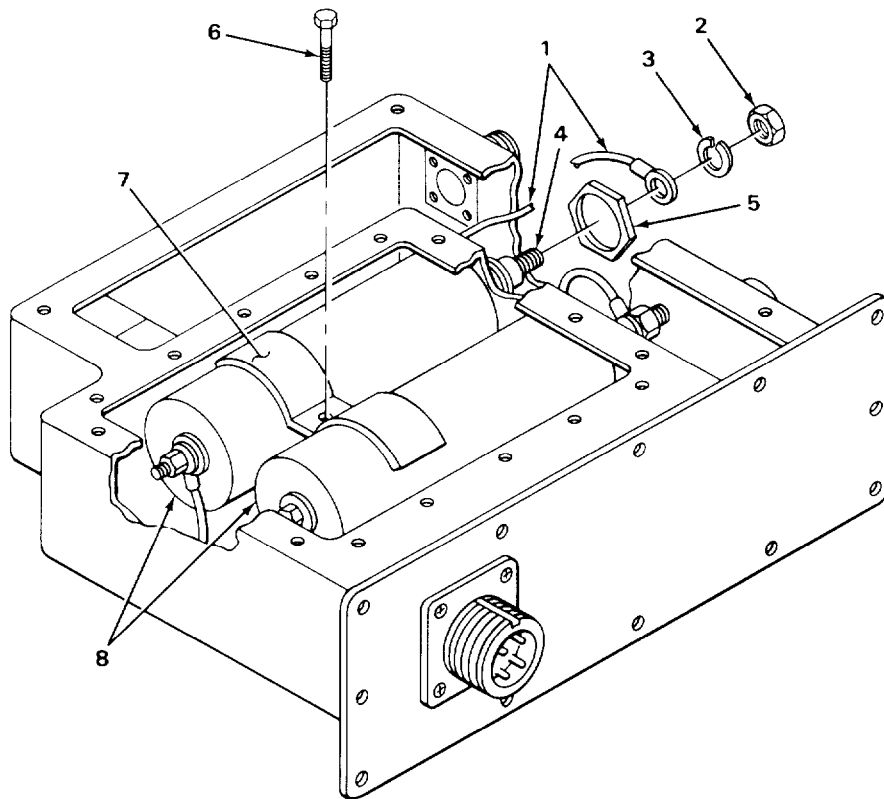
2. Remove shrink tubing (4) if installed.
3. Tag and unsolder wires (5) from terminals of lampholder.
4. Remove nut (6) that secures lampholder to unit (7).
5. Remove lampholder (3).

### INSTALLATION

1. Install shrink tubing over wires.
2. Install lampholder (3) to unit (7) with nut (6).
3. Solder wires (5) to terminals of lampholder as tagged.
4. Position and heat the shrink tubing (4).
5. Install lamp (2) and lens (1) on lampholder.

**2-24. FILTER REPLACEMENT.**

The AN/G RC-122/142 plain and C models have two ac filters located in ac entrance box in rear of shelter and one dc filter located in dc entrance box in front of shelter. The AN/G RC-122/142A, B, D, and E models have three filters, two ac and one dc, located in power/signal entrance box in front of shelter. Perform ac or dc filter replacement procedures as given below.



EL6VT066

**REMOVAL OF AC FILTERS**

**WARNING**

A voltage potential exists at filters. Before attempting removal, short filters out to prevent electrical shock to personnel.

**NOTE**

Removal of ac filters is the same for all models. Positioning of mounting nuts and brackets may vary.

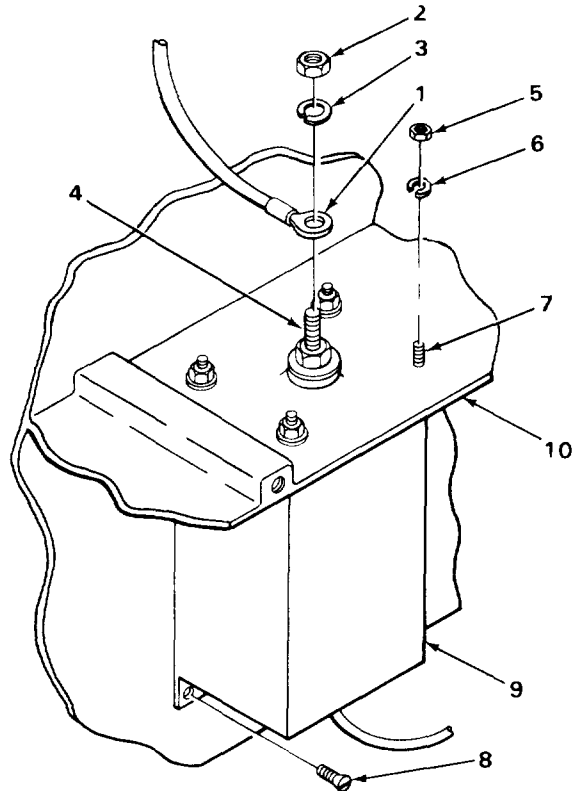
1. Tag all wires (1).
2. Remove four nuts (2), lockwashers (3), and wires (1) from terminals (4).
3. Remove two mounting nuts (5).
4. Remove screw (6), mounting bracket (7), and filters (8).

**INSTALLATION OF AC FILTERS**

1. Put filters (8) in place and, using screw (6), install mounting bracket (7).
2. install two mounting nuts (5).

**2-24. FILTER REPLACEMENT. (CONT)**

3. Install four wires (1) on terminals (4) as tagged.
4. Install four lockwashers (3) and nuts (2).



EL6VT067

**REMOVAL OF DC FILTER****WARNING**

A voltage potential exists at filters. Before attempting removal, short filters out to prevent electrical shock to personnel.

**NOTE**

Removal of dc filters is the same for all models. Positioning of mounting nuts and brackets may vary.

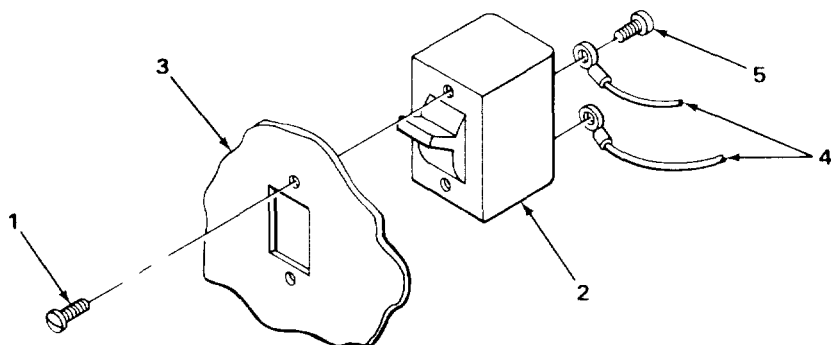
1. Tag wires (1).
2. Remove two nuts (2), lockwashers (3), and wires (1) from terminals (4).
3. Remove four nuts (5) and lockwashers (6) from terminals (7).
4. Remove two screws (8).
5. Remove filter (9) from mounting (10).

**INSTALLATION OF DC FILTER**

1. Put filter (9) in place.
2. Install four lockwashers (6) and nuts (5) to terminals (7).
3. Install two screws (8).
4. Using two lockwashers (3) and nuts (2), install two wires (1) on terminals (4).

**2-25. CIRCUIT BREAKER REPLACEMENT.**

This paragraph covers replacement of circuit breakers from all power distribution panels. Procedures may vary slightly between components.



EL6VT069

**REMOVAL**

1. Remove two screws (1) and pull circuit breaker (2) out from unit (3) to gain access to connections.
2. Tag wires (4).
3. Loosen screws (5) and remove wires (4).
4. Remove circuit breaker (2).

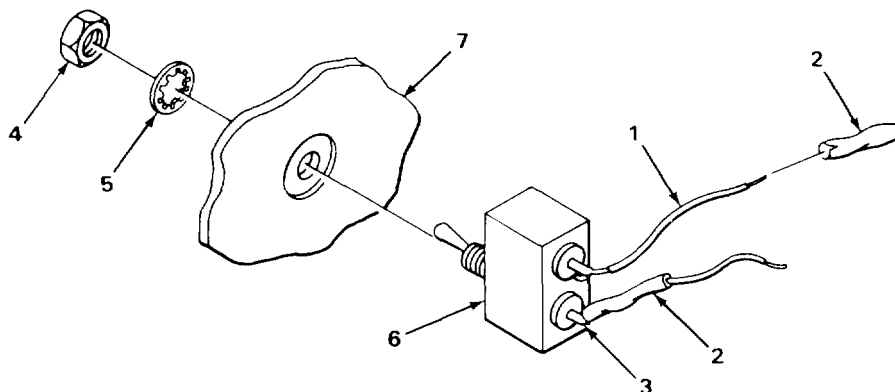
**INSTALLATION**

1. Install wires (4) to circuit breaker (2) as tagged.
2. Tighten screws (5).
3. Put circuit breaker (2) into position and install screws (1).

**2-26. SWITCH REPLACEMENT.**

This procedure covers removal of switches for power distribution panels, switch box, switch assembly, control panel, and ac/dc distribution box. Some switches contain more than two wire connections.

**MATERIALS/PARTS:** Shrink tubing



EL6VT068



**2-26. SWITCH REPLACEMENT. (CONT)****NOTE**

Some switches are operated in tandem with other switches. This is accomplished by using a bar to connect both switches. Disconnect bar from switch to be removed.

**REMOVAL**

1. Tag all wires (1).

**CAUTION**

Before soldering or unsoldering, familiarize yourself with TB SIG-222 to prevent possible damage to equipment.

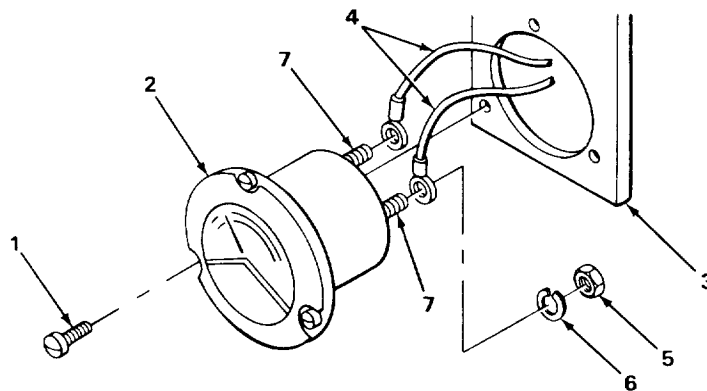
2. Remove shrink tubing (2) if installed.
3. Unscrew or unsolder wires (1) from terminals (3).
4. Remove nut (4) and lockwasher (5).
5. Remove switch (6) from unit (7).

**INSTALLATION**

1. Install shrink tubing (2) over wires.
2. Using nut (4) and lockwasher (5), install switch (6) to unit (7).
3. Screw or solder wires (1) to terminals (3) as tagged.
4. Position and heat shrink tubing (2).

**2-27. METER REPLACEMENT.**

This procedure covers removal of voltmeter or ampmeter used on power distribution panels SB-3018/GRC and SB-3358/GRC.



EL6V T070

**REMOVAL**

1. Remove three screws (1) and pull meter (2) out from unit (3).
2. Tag wires (4).
3. Remove two nuts (5), lockwashers (6), and wires (4) from terminals (7).

## 2-27. METER REPLACEMENT. (CONT)

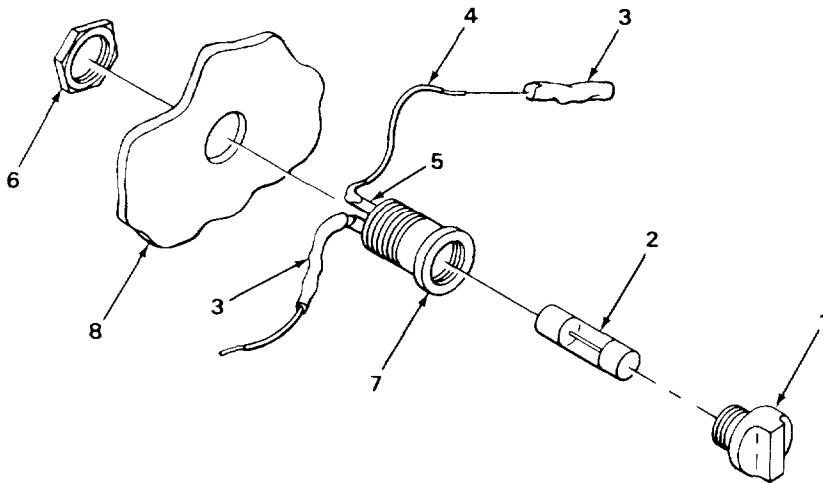
### INSTALLATION

1. Using two lockwashers (6) and nuts (5), install wires (4) as tagged on meter terminals (7).
2. Install meter (2) in unit (3).
3. Install three screws (1).

## 2-28. FUSE HOLDER REPLACEMENT.

This procedure covers replacement of fuse holders for power distribution panel SB-3018/GRC.

MATERIALS/PARTS: Shrink tubing



EL6VT071

### REMOVAL

### CAUTION

Before soldering or unsoldering, familiarize yourself with TB SIG-222 to prevent possible damage to equipment.

1. Remove lens cover (1) and fuse (2).
2. Remove shrink tubing (3) if installed.
3. Tag wires (4) and unsolder from terminals (5).
4. Remove nut (6) from fuse holder (7).
5. Remove fuse holder (7) from unit (8).

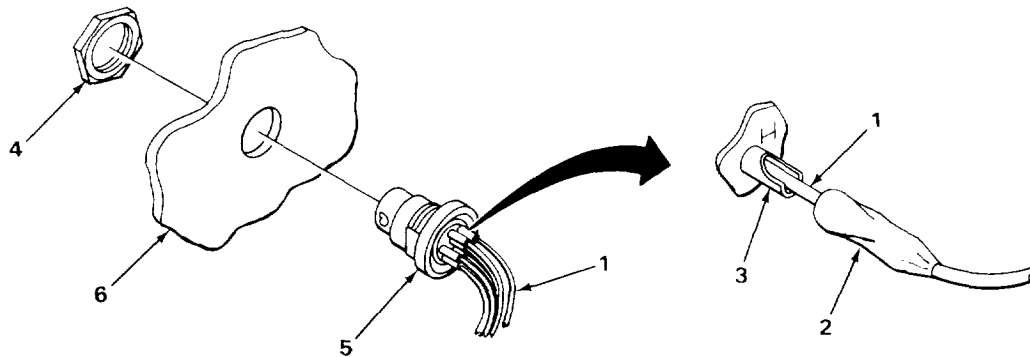
### INSTALLATION

1. Install shrink tubing (3) over wires.
2. Using nut (6), install fuse holder (7) into unit (8).
3. Solder wires (4) to terminals (5) as tagged.
4. Position and shrink the shrink tubing (3).
5. Install fuse (2) and lens cover (1).

**2-29. CONNECTOR REPLACEMENT.**

This procedure covers removal of connectors from switch box, switch assembly, control panel, and dummy boxes. Procedures may vary slightly between components. All connector pins are labeled for proper wire to pin connections.

MATERIALS/PARTS: Shrink tubing



EL6VT072

**REMOVAL****CAUTION**

Before soldering or unsoldering, familiarize yourself with TB SIG-222 to prevent possible damage to equipment.

1. Tag all wires (1) and remove shrink tubing (2).
2. Unsolder wires (1) from connector pins (3).
3. Remove nut (4) from connector (5).
4. Remove connector from unit (6).

**INSTALLATION**

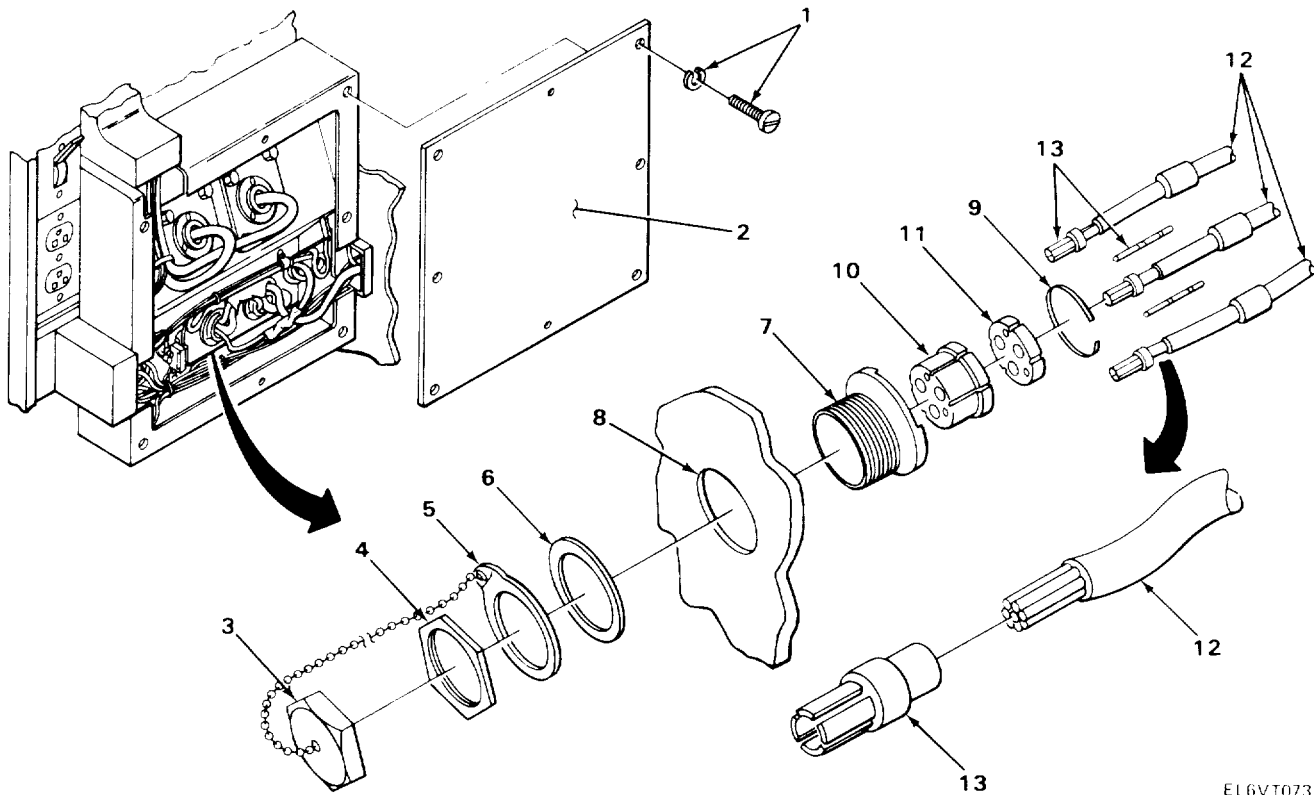
1. Install shrink tubing (2) over wires (1).
2. Using nut (4), install connector (5) into unit (6).
3. Solder wires (1) to connector as tagged.
4. Position and heat shrink tubing (2).

**2-30. POWER/SIGNAL ENTRANCE BOX POWER RECEPTACLE REPLACEMENT.**

Power receptacles in power/signal entrance box are repaired by replacing damaged contacts. If connectors have not been repaired previously, and factory-installed contacts are still in place, the leads must be cut from contacts. This must be done because original equipment contacts are crimped onto the leads and cannot be unsoldered. Contacts cannot be replaced singly. If only one contact requires replacement, or one lead has broken in use, all leads must be cut and a new contact soldered on each lead. Refer to TM 55-1500-323-25.

TOOLS: Connector pin extractor tool set  
Soldering Iron, 500-watt

MATERIALS/PARTS: Connector pins  
Solder



EL6VT073

REMOVAL

**WARNING**

To avoid shock, disconnect power cable at power/signal entrance box receptacle before performing any maintenance tasks in power/signal entrance box.

**2-30. POWER/SIGNAL ENTRANCE BOX POWER RECEPTACLE REPLACEMENT. (CONT)**

1. Working inside shelter, remove eight screws and washers (1) and take off POWER/SIGNAL ENTRANCE BOX interior cover (2).
2. Working outside shelter, remove dust cap (3), nut (4), chain plate (5), and gasket (6) from receptacle body (7).
3. Push receptacle body (7) back through entrance box mounting hole (8) into shelter.

**WARNING**

Use caution when removing and installing retaining ring (9). Retaining ring can fly off causing serious injury to personnel.

4. Remove retaining ring (9) from rear of receptacle body (7).
5. Remove insert (10), grommet (11), and associated leads (12) from receptacle body (7).
6. Tag each lead for identification and remove contacts (13) from insert (10) and grommet (11).

**NOTE**

If contacts are crimped onto associated leads, cut leads as close to contacts as possible. If contacts are soldered onto leads, unsolder. Refer to TB SIG-222.

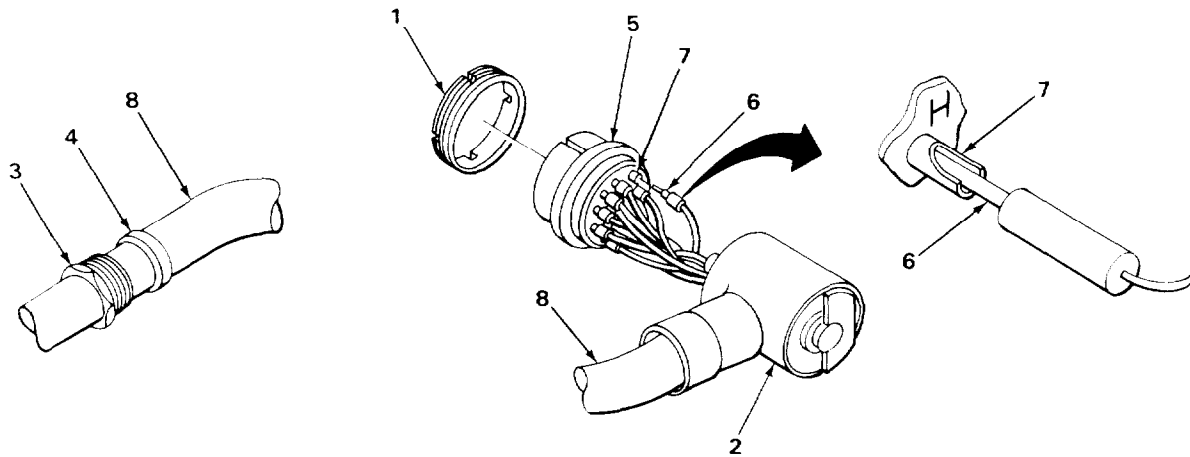
7. Remove contacts (13) from leads (12).

**INSTALLATION**

1. Position contacts (13) on leads (12) and solder in place.
2. Slide retaining ring (9) on leads (12).
3. Install contacts (13) in grommet (11) and insert (10).
4. Install insert (10) and grommet (11) in receptacle body (7) and secure with retaining ring (9).
5. Position receptacle body (7) in mounting hole (8) in POWER/SIGNAL ENTRANCE BOX and, working outside shelter, install gasket (6) and chain plate (5). Secure with nut (4).
6. Install dust cap (3) on receptacle body (7).
7. Working inside shelter, position interior cover (2) on POWER/SIGNAL ENTRANCE BOX and secure with eight screws and washers (1).

### 2-31. CABLE ASSEMBLY REPAIRS.

If organizational maintenance testing finds a cable to be faulty, perform the following procedures for repair of a cable.



EL6VT074

1. Using spanner wrench, remove locknut (1) from plug housing (2).
2. Using wrench, loosen gland nut (3) and remove gland (4).
3. Pull plug (5) from plug housing (2).
4. Check for loose or broken wires (6) and shorted connections.

#### NOTE

Using ohmmeter, check for shorting between adjacent pins.

5. Resolder any wires (6) that are disconnected from their pins (7).

#### NOTE

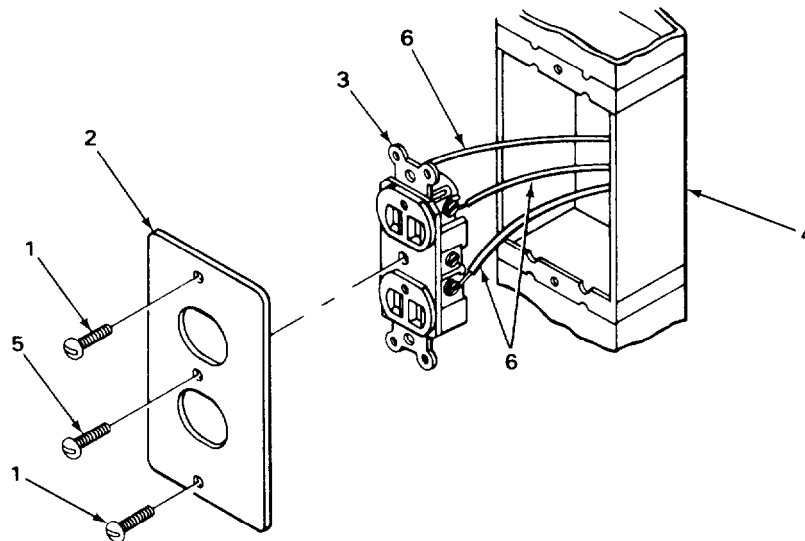
Refer to wiring diagrams for details covering wire connections and proper color coding

Before soldering or unsoldering, be familiar with TB SIG-222.

6. Test cable for continuity and/or shorting.
7. Push plug (5) into plug housing (2).
8. Using spanner wrench, install locknut (1) into plug housing (2).
9. Pull cable (8) to eliminate slack in plug housing (2).
10. Insert gland (4) into plug housing (2).
11. Install gland nut (3) into plug housing and tighten with wrench.

**2-32. RECEPTACLE REPLACEMENT.**

This procedure is typical for all raceway-mounted receptacles.



EL6VT075

**REMOVAL**

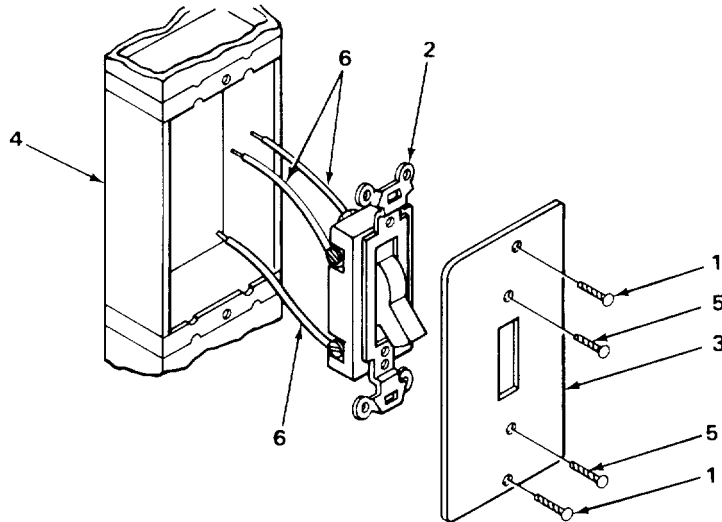
1. Remove two screws (1) and pull receptacle cover (2) and receptacle (3) from raceway (4).
2. Remove screw (5) and receptacle cover (2) from receptacle (3).
3. Tag all leads (6) for identification.
4. Loosen terminal screws securing leads (6) to receptacle (3) and remove receptacle.

**INSTALLATION**

1. Install leads (6) on terminal screws of receptacle (3) as tagged.
2. Position receptacle cover (2) on receptacle (3) and secure with screw (5).
3. Position receptacle (3) and receptacle cover (2) in raceway (4) and secure with two screws (1).

### 2-33. RACEWAY SWITCH REPLACEMENT.

This procedure is typical for all raceway-mounted switches.



EL6VT076

#### REMOVAL

1. Remove two screws (1) and pull switch (2) and switchplate (3) from raceway (4).
2. Remove two screws (5) and separate switchplate (3) from switch (2).
3. Tag all leads (6) for identification.
4. Loosen terminal screws securing leads (6) to switch (2) and remove switch (2).

#### INSTALLATION

1. Install leads (6) on terminal screws of switch (2) as tagged.
2. Position switchplate (3) on switch (2) and secure with two screws (5).
3. Position switch (2) and switchplate (3) in raceway (4) and secure with two screws (1).



## CHAPTER 3

### GENERAL SUPPORT MAINTENANCE

General support maintenance consists of all procedures necessary to overhaul Radio Teletypewriter Sets AN/G RC-122/142(\*). For specific procedures, refer to chapter 2.

# APPENDIX A

## REFERENCES

**A-1. SCOPE.**

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual.

**A-2. FORMS.**

- Reporting of Transportation Discrepancies in shipment (RCS MTMC-54 (R1)) (NAVSUPINST 4610 33B, AFR-75-18 MCOP 4610 19C DALAR 450015) ..... AR 55-38
- Identification and Distribution of DA Publications and Issue of Agency and Command Administration Publications ..... AR 310-2
- Reporting of Item and Packaging Discrepancies (DLAR 4140-55, NAVMATINST 4355 73A, AFR 400-54 MCO 4430 3F) ..... AR 735-11-2
- Recommended Changes to Equipment Technical Publications (S & U DARCOM) ..... DA Form 2028-2

**A-3. PAMPHLETS.**

- Index of Technical Publications ..... DA PAM 25-30
- U.S. Army Equipment Index of Modification Work Orders ..... DA PAM 310-7
- The Standard Army Publications System (STARPUBS) ..... DA PAM 310-10-2
- The Army Maintenance Management System (TAMMS) ..... DA PAM 387-750

**A-4. SERVICE AND TECHNICAL BULLETINS.**

- Vehicular Radio Sets and Authorized installations ..... SB 11-131
- Preservation, Packaging and Packing Materials, Supplies, and Equipment used by the Army ..... SB 38-100
- Solder and Soldering ..... TB SIG-222
- Safety Measures to be Observed When Installing and Using Whip Antennas, Field-Type Masts, Towers, Antennas, and Metal Poles That Are Used With Communications, Radar, and Direction Finder Equipment ..... TB SIG-291
- Identification of Radioactive Items in the Army Supply System ..... TB 43-0116
- Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters ..... TB 43-0118
- Instructions for Safe Handling and Identification of US Army Communications, Electronics Command Managed Radioactive Items in the Army Supply System ..... TB 43-0122
- Maintenance and Repair Procedures for Shelters, Electrical Equipment S-141/G and S0141 B/G (NSN 5410-00-752-9698), 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-280 B/G (5410-00-117-2868), S-280 B/G (Shielded) (5410-00-001-4093), S-280 C/G and S-318/G (5410-00-763-2339) and S-318A/G (5410-00-116-7086) ..... TB 43-0124

**A-5. TECHNICAL MANUALS.**

Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Air Conditioner, Wall or Base Mounted, Air Cooled; Self-Contained, Electric Motor Driven; 6,000 BTU/HR, 115 V, 1 Phase, 2 Wire, 50/60 Cycle (Redmanson Model CE-6A-60A) (NSN 4210-00-926-1161) and 208 V, 3 Phase, 4 Wire, 400 Cycle (Redmanson Model CE-6A-400A) (4120-00-926-1162) . . . . .	TM 5-4120-289-15
Operator's, Organizational, Direct Support, General Support and Depot Maintenance Manual (Including Repair Parts and Special Tools List) for Heater, Space, Fuel Oil and Gasoline: 15,000 Btu/Hr Output, DC 24V (Hupp Model MH15B3C-1) (FSN 4520-878-9393) . . . . .	TM 5-4520-211-14
Operator, Organizational, Direct Support and General Support Maintenance Manual: Heater Space, Portable. Air Circulating Type Multifuel, with Blower 15,000 BTU/HR (Hunter Manufactur- ing Co Model UH-48B TYPE III FSN 4520-935-9355) . . . . .	TM 5-4520-236-14
Organizational, Direct Support Maintenance Manual (Including Repair Parts and Special Tools List): Can, Gasoline, Mili- tary, Steel, 5-Gal (FSN 7240-222-3088); Can, Water, Military, Steel, 5-Gal (7240-242-6153); Can, Water, Military, Aluminum, 5-Gal (7240-242-3767); Can, Water, Military, Plastic, 5-Gal (7240-089-3827); and, Case, Military Water Can (7240-125-9061) . . . . .	TM 10-7200-200-13
Control Group AN/GRA-6 . . . . .	TM 11-5038
Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Shelter, Electrical Equipment S-318/G . . . . .	TM 11-5410-212-15P
Operator's and Organizational Maintenance Repair Parts and Special Tools List for Shelter, Electrical Equipment S-250/G (NSN 5410-00-999-4935) . . . . .	TM 11-5410-214-12P
Operator and Organizational Maintenance Manual: Telephone Set, TA-312/PT (NSN 5805-00-543-0012) . . . . .	TM 11-5805-201-12
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual; Modem, Radio Teletypewriter MD-522/ GRC (NSN 5815-00-999-5277) . . . . .	TM 11-5805-387-15-1
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Radio Teletypewriter Modem, MD-522A/GRC (NSN 5815-00-919-4800) . . . . .	TM 11-5805-387-15-2
Organizational Repair Parts List: Modem, Radio Teletypewriter MD-522A/GRC . . . . .	TM 11-5805-387-20P-2
Operator's and Organizational Maintenance Manual: Teletype- writer Sets, AN/FGC-20 (NSN 5815-00-503-2652), AN/FGC-20X (5815-00-392-7743), AN/FGC-21 (5815-00-503-2653), AN/FGC-66 (5815-00-817-9277), AN/FGC-159 and AN/FGC-159X (5815-00-561- 7964), AN/FGC-160 (5815-00-025-9036), AN/FGC-177 (5815-01- 017-3780), AN/UGC-4 (5815-00-557-5970), AN/UGC-29 (5815-00- 082-4199), ANWGC-29X (5815-00-032-4200) and Teleprinter, TT-259/FG (5815-00-688-8761) (TO 31W4-2FGC20-31) . . . . .	TM 11-5815-200-12
Operator's Manual: Radio, Teletypewriter Sets AN/GRC-46, AN/GRC-46A, AN/GRC-46B, AN/GRC-46C, and AN/URC-29 . . . . .	TM 11-5815-204-10
Organizational Maintenance Manual: Radio Teletypewriter Sets AN/GRC-46, AN/GRC-46A, AN/GRC-46B, and AN/URC-29 . . . . .	TM 11-5815-204-20

**A-5. TECHNICAL MANUALS. (CONT)**

Operator's and Organizational Maintenance Manual for Teletype-writer Sets AN/PGC-1 and AN/PGC-3 and Teletypewriters TT-4A/TG, TT-4B/TG, TT-4C/TG, TT-335/TG, TT-537/TG, TT-698/TG, TT-698A/TG, TT-698B/TG, TT-722/TG, and TT-722A/TG . . . . .	TM 11-5815-206-12
Operator's and Organizational Maintenance Manual: Teletype-writer Sets AN/GGC-3 (NSN 5815-00-503-3309), AN/GGC-3A (5815-00-503-3309), AN/GGC-3A (5815430-581-9751), AN/GGC-53 (5815-01-012-8772), and AN/GGC-53A (5815-01-017-0956), and Teletypewriter Reperforator-Transmitters TT-76/GGC (5815-00-503-2760), TT-76A/GGC, TT-76B/GGC, TT-76C/GGC (5815-00-553-6061), TT-699/GGC (5815-01-012-8446), TT-699A/GGC, TT-699B/GGC, and TT-699C/GGC (5815-01-017-9166) . . . . .	TM 11-5815-238-12
Operator's Maintenance Manual: Radio Teletypewriter Sets, AN/GRC-122, AN/GRC-122A, AN/GRC-122B, AN/GRC-122C, AN/GRC-122D, AN/GRC-122E, AN/GRC-142, AN/GRC-142A, AN/GRC-142B, AN/GRC-142C, AN/GRC-142D, and AN/GRC-142E . . . . .	TM 11-5815-334-10
Organizational Maintenance Manual: Radio Teletypewriter Sets, AN/GRC-122, AN/GRC-122A, AN/GRC-122B, AN/GRC-122C, AN/GRC-122D, AN/GRC-122E, AN/GRC-142, AN/GRC-142A, AN/GRC-142B, AN/GRC-142C, AN/GRC-142D, and AN/GRC-142E . . . . .	TM 11-5815-334-20
Organizational Maintenance Repair Parts and Special Tools List for Radio Teletypewriter Sets, AN/GRC-122 (5815-00-401-9719), AN/GRC-122A (5815-00-167-7998), AN/GRC-122B (5815-00-937-5295), AN/GRC-142 (5815-00-401-9720), AN/GRC-142A (5815-00-168-1556), AN/GRC-142B (5815-00-443-5511), and AN/GRC-142C (5815-01-100-6815) . . . . .	TM 11-5815-334-20P
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Device, Low-Level Signaling TT-523/GGC (NSN 5815-00-937-6146) and TT-523A/GGC (NSN 5815-00-999-3048) . . . . .	TM 11-5815-338-15
Operator's and Organizational Maintenance Manual for Terminal, Communications AN/UGC-74A(V)3 (NSN 5815-01-01-062-8194) . . . . .	TM 11-5815-602-12
Direct Support and General Support Maintenance Manual: Terminal, Communications AN/UGC-74A(V)3 (NSN 5815-01-062-8194) . . . . .	TM 11-5815-602-34
Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Antenna Group AN/GRA-50 (NSN 5985-00-892-0758) . . . . .	TM 11-5820-467-15
Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools) for Antenna Group AN/GRA-50 (NSN 5985-00-892-0758) . . . . .	TM 11-5820-467-24P
Organizational Maintenance Repair Parts and Special Tool Lists for Control Group AN/GRA-6 (NSN 5820-00-644-4554) . . . . .	TM 11-5820-489-20P
Operator's and Organizational Maintenance Manual: Radio Sets AN/GRC-106 (NSN 5820-00-402-2263) and AN/GRC-106A (NSN 5820-00-223-7548) . . . . .	TM 11-5820-520-12
Operator's and Organizational Maintenance Manual: Power Supplies PP4763/GRC (NSN 5820-00-937-7690) and PP-4763A (5820-00-113-9768) . . . . .	TM 11-5820-765-12
Operator's, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools): Dynamic Loudspeaker LS-166/U, (FSN 5965-243-640) . . . . .	TM 11-5965-222-14P

**A-5. TECHNICAL MANUALS. (CONT)**

Operator's, Organizational, Field and Depot Maintenance Repair  
Parts and Special Tool Lists: Handset H-111/U ..... TM 11-5965-244-15P

Operator's, Organizational, Direct Support, General Support,  
and Depot Maintenance Manual: Motor-Generator PU-724/G  
(NSN 6125-00-617-1435) ..... TM 11-6125-252-15

Operator, Organizational, DS, GS and Depot Maintenance Manual:  
Multimeters ME-26A/U, ME-26B/U, ME-26C/U, and ME-26 D/U ..... TM 11-6625-200-1

Operator's and Organizational Maintenance Manual: Multimeters  
AN/URM-105 and AN/URM-105C (Including Multimeters ME-77/U and  
ME-77C/U) ..... TM 11-6625-203-12

Operator's, Organizational, Direct Support, General Support,  
and Depot Maintenance Manual: Standing-Wave-Ratio Power Meter  
ME-165/G (NSN 6625-00-682-4464) ..... TM 11-6625-333-15

Organizational, DS, GS and Depot Maintenance Manual: Multi-  
meter TS-352B/U ..... TM 11-6625-366-15

Operator, Organizational, Field and Depot Maintenance Manual:  
Wattmeter AN/URM-120 ..... TM 11-6625-446-15

Procedures for Destruction of Electronic Material to Prevent  
Enemy Use (Electronics Command) ..... TM 750-244-2

## APPENDIX B

### EXPENDABLE SUPPLIES AND MATERIALS LIST

#### Section I INTRODUCTION

#### B-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain Teletypewriter Radio Set AN/GRC-122/142(\*). These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

#### B-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 (eg, Use Cleaning Compound, Item 13 App B).
- b. Column 2, Level. This column identifies the lowest level of maintenance that requires the listed item.  
  
C – Operator/Crew  
O – Organizational Maintenance/Aviation Unit Maintenance  
F – Direct Support Maintenance/Aviation Intermediate 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 Federal Supply Code for Manufacturer (FSCM) in parentheses followed by a part number.
- e. Column 5, U/M (Unit of Measure). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (eg, ea, in., pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

**Section II EXPENDABLE SUPPLIES AND MATERIALS LIST**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION (FSCM)	(5) U/M
1	O	8020-00-721-9657	Brush, Paint 2 In. (81848) MB-451	ea
2	O	8305-00-222-2433	Cloth, Cheesecloth (81348) CCCC660	ea
3	O	8010-00-111-7937	Paint, Forest Green ALKYD Enamel TB-43-0118 (81349) MILE-52798A	gal
4	C		Paper, Fanfold, Single Ply	bx
5	C		Paper, Fanfold, 3-Ply	bx
6	C	7530-00-223-7966	Paper, Roll, Single Ply (81348)	rl
7	C	7530-00-223-7966	Paper, Teletypewriter (81348) UU-P-577	ea
8	C	7510-00-281-5234	Pencil, Number 2 (81348) SS-P-166	doz
9	C	7510-00-082-2648	Ribbon, Printing, Teletypewriter (81348) DDD-R-306	ea
10	C	7510-00-923-0252	Ribbon, Teletypewriter (80063) SM-B-765911	ea
11	O		Shrink Tubing	ft
12	C	7530-00-634-6237	Tape, Teletypewriter, Paper (81348) UU-T-137	ea
13	C	7920-00-965-5700	Towel, Machinery (81348) CCC-C-444	ea
14	C	6850-00-105-3084	Trichlorotrifluoroethane FREONT 16 Oz Can (18596)	oz

## GLOSSARY

### Section I ABBREVIATIONS

am – Amplitude Modulation	nsk – Narrow Shift Key
ant – Antenna	ow – Order Wire
cw – Continuous Wave	owr – One Way Reversible
dx – Duplex	rcvr – Receiver
fsk – Frequency Shift Keying	rf – Radio Frequency
k – Kilohms	ssb – Single Sideband
ma – Milliampere	tty – Teletypewriter
mw – Milliwatt	

### Section II DEFINITIONS OF UNUSUAL TERMS

TERM	DEFINITION
Dummy Box	Equipment used to complete signal path through system circuits when special security equipment is not installed.
Keying	Completing the circuit which allows the radio to transmit signals.
Modem	Equipment which modulates and demodulates signals transmitted over communications facilities.
Pony Circuit	Permits one-way reversible tty messages to be sent and received over land lines between the remote site and the shelter.
Standing Wave Ratio	The ratio of current (or voltage) at a loop (maximum) in the transmission line to the value at a (minimum) mode. It is equal to the ratio of the characteristic impedance of the line to the impedance of the load connected to the output end of the line.
Standing Wave Ratio Meter	Device for measuring the standing wave ratio in a transmission line.
Teletypewriter Loop	Dc series circuit with teletypewriter send and/or receive circuits connected in series with a dc source.



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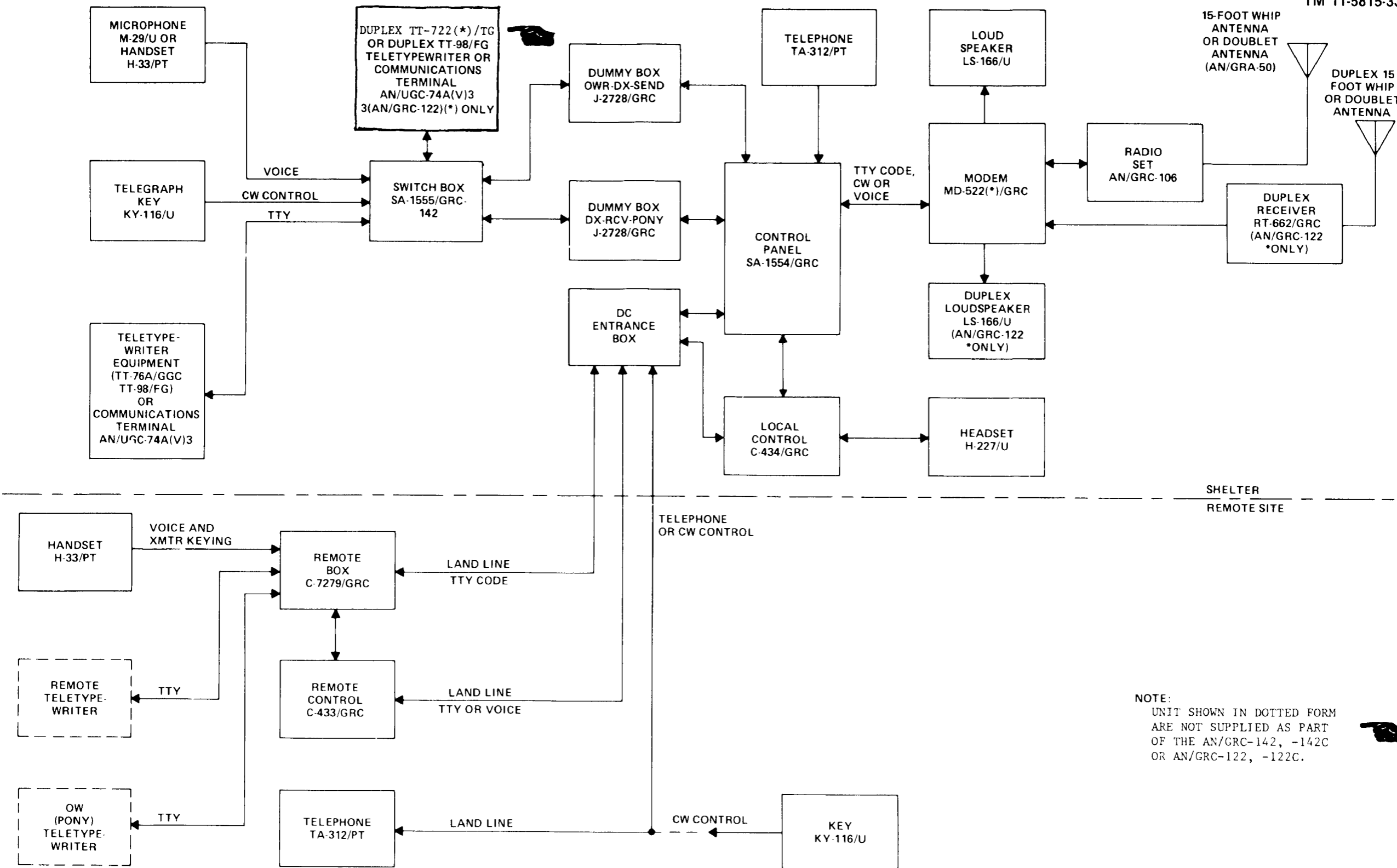
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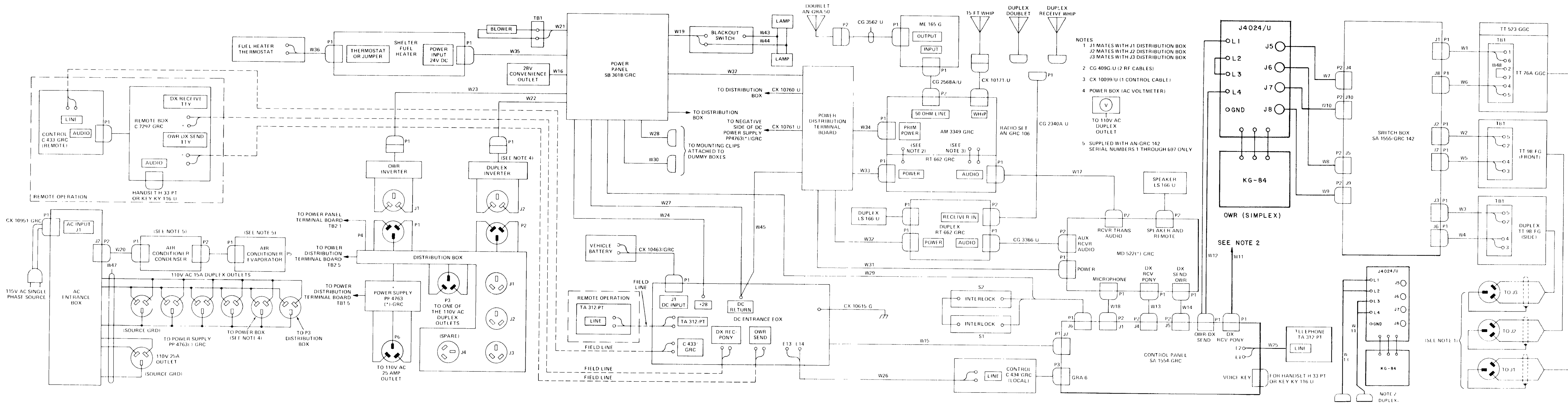
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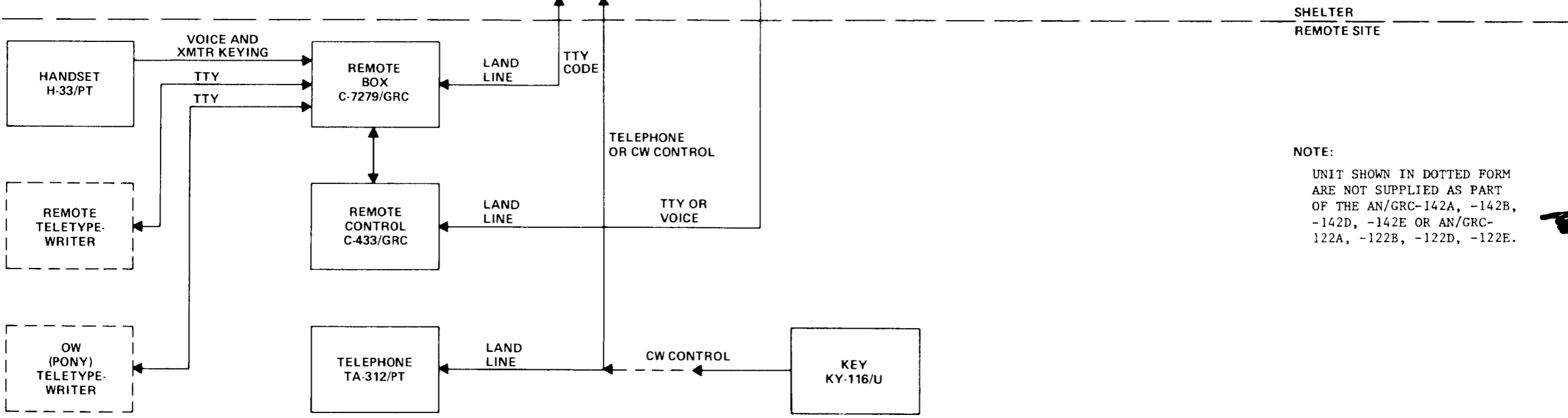
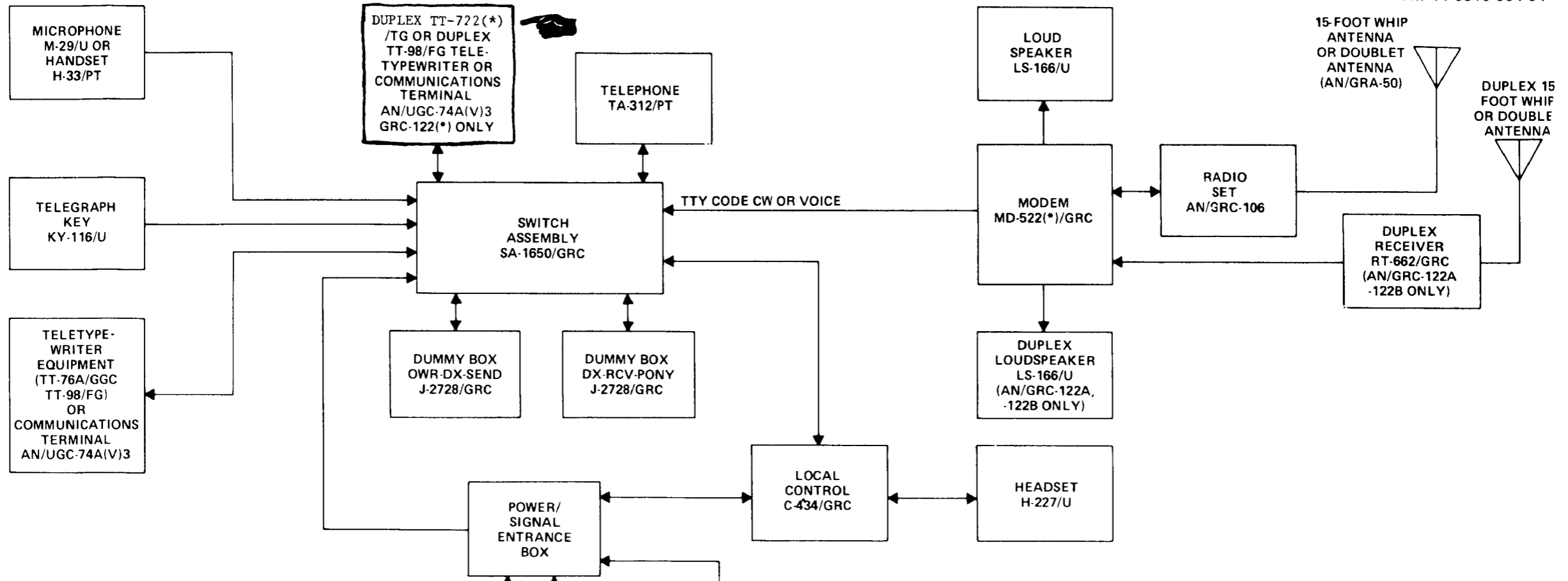


NOTE:  
 UNIT SHOWN IN DOTTED FORM  
 ARE NOT SUPPLIED AS PART  
 OF THE AN/GRC-142, -142C  
 OR AN/GRC-122, -122C.

EL6VT006  
 FO-1. AN/GRC-122/142 Plain and  
 C Models Block Diagram.



FO-11. Radio Teletypewriter Sets  
AN/GRC - 122/142(\*) Cording Diagram  
With MK-2488.

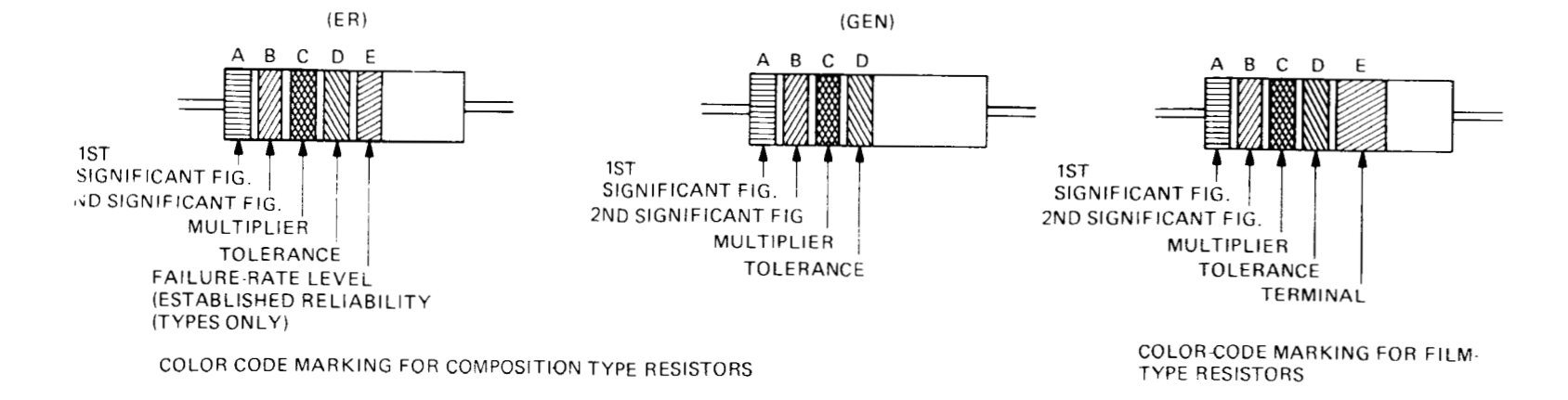


SHELTER  
REMOTE SITE

NOTE:  
UNIT SHOWN IN DOTTED FORM  
ARE NOT SUPPLIED AS PART  
OF THE AN/GRC-142A, -142B,  
-142D, -142E OR AN/GRC-  
122A, -122B, -122D, -122E.

FO-2. AN/GRC-122/142A, B, D, and E Models Block Diagram. E1 6VT005





**TABLE 1**  
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM.
BLACK	0	BLACK	0	BLACK	1			BROWN	M = 1.0	
BROWN	1	BROWN	1	BROWN	10			RED	P = 0.1	
RED	2	RED	2	RED	100			ORANGE	R = 0.01	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S = 0.001	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP TYPE ONLY)	WHITE		SOLD-ERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5 (NOT APPLICABLE TO ESTABLISHED RELIABILITY)			
BLUE	6	BLUE	6	BLUE	1,000,000	RED				
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	0.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A - THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH)

BAND B - THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C - THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL VALUE)

BAND D - THE RESISTANCE TOLERANCE.

BAND E - WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL (PERCENT FAILURE PER 1,000 HOURS). ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1½ TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHANUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE

2R7 = 2.7 OHMS      10R0 = 10.0 OHMS

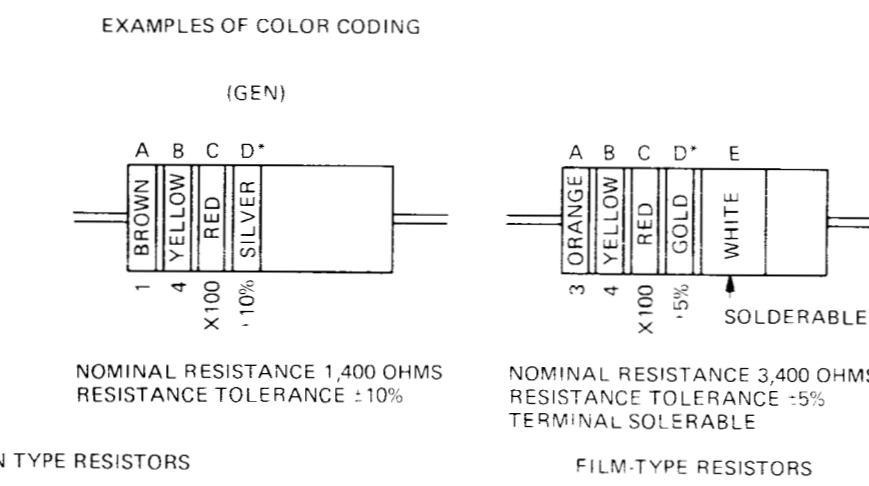
FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

**TABLE 2**  
COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES.

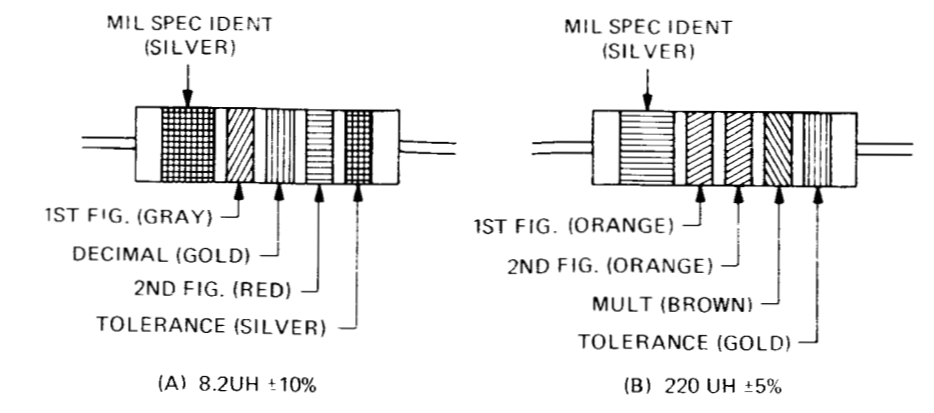
COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD		DECIMAL POINT	5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

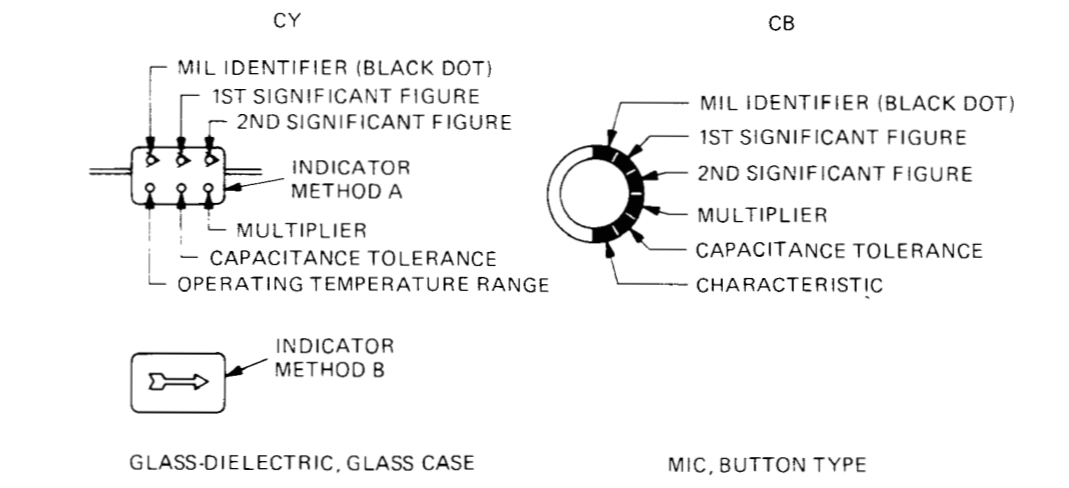
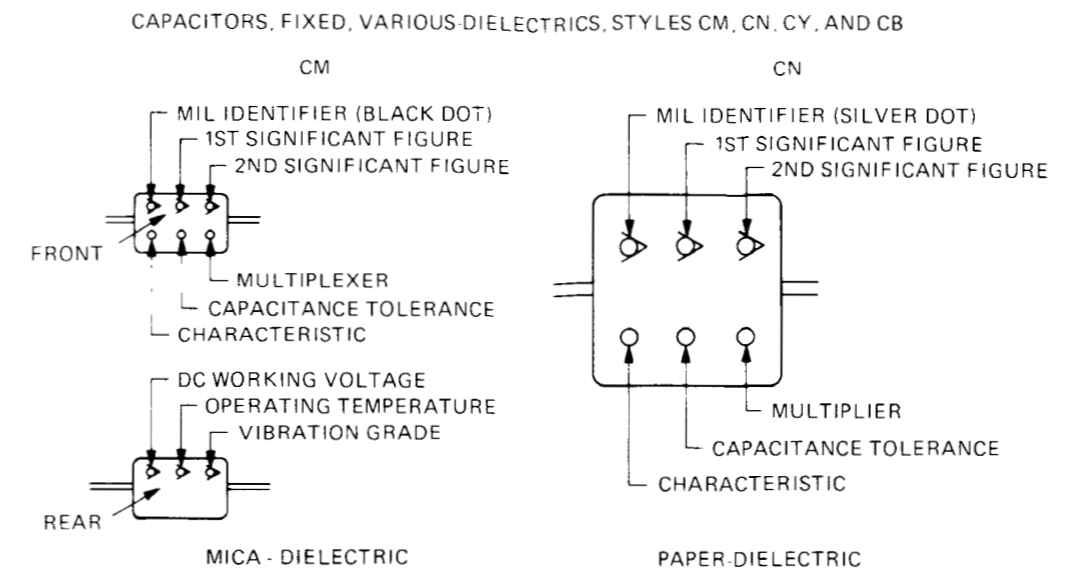
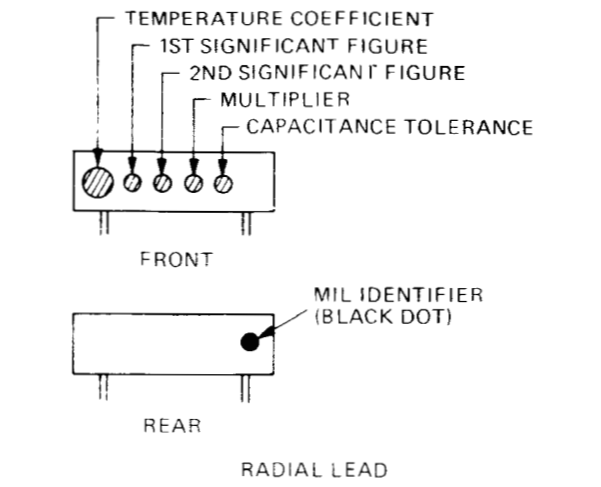
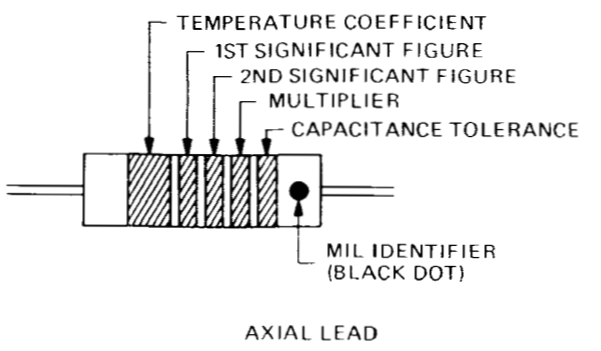
**B** COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.



**A** COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS



COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES. AT A, AN EXAMPLE OF THE CODING FOR AN 8.2UH CHOKES IS GIVEN. AT B, THE COLOR BANDS FOR A 330 UH INDUCTOR ARE ILLUSTRATED.



**TABLE 3 - FOR USE WITH STYLES CM, CN, CY AND CB.**

COLOR	MIL ID	1ST SIG FIG.	2ND SIG FIG.	MULTIPLIER <sup>1</sup>	CAPACITANCE TOLERANCE				CHARACTERISTIC <sup>2</sup>			DC WORKING VOLTAGE CM	OPERATING TEMP RANGE CY, CM	VIBRATION GRADE CM
					CM	CN	CY	CB	CM	CN	CB			
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A			-55° TO +70°C	10 - 55 Hz	
BROWN		1	1	10					B	E	B			
RED		2	2	100	±2%		±2%	±2%	C			-55° TO +85°C		
ORANGE		3	3	1,000		±30%			D	D		300		
YELLOW		4	4	10,000					E			-55° TO +125°C	10 - 2,000 Hz	
GREEN		5	5		±5%				F			500		
BLUE		6	6									-55° TO +150°C		
PURPLE (VIOLET)		7	7											
GRAY		8	8											
WHITE		9	9											
GOLD				0.1			±5%	±5%						
SILVER	CN			0.01	±10%	±10%	±10%	±10%						

**TABLE 4 - TEMPERATURE COMPENSATING, STYLE CC**

COLOR	TEMPERATURE COEFFICIENT <sup>4</sup>	1ST SIG FIG.	2ND SIG FIG.	MULTIPLIER <sup>1</sup>	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		±2.0 UUF	CC
BROWN	-30	1	1	10	±1%		
RED	-80	2	2	100	±2%	±0.25 UUF	
ORANGE	-150	3	3	1,000			
YELLOW	-220	4	4				
GREEN	-330	5	5		±5%	±0.5 UUF	
BLUE	-470	6	6				
PURPLE (VIOLET)	-750	7	7				
GRAY		8	8	0.01*			
WHITE		9	9	0.1*	±10%		
GOLD	+100			0.1		±1.0 UUF	
SILVER				0.01			

1. THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF

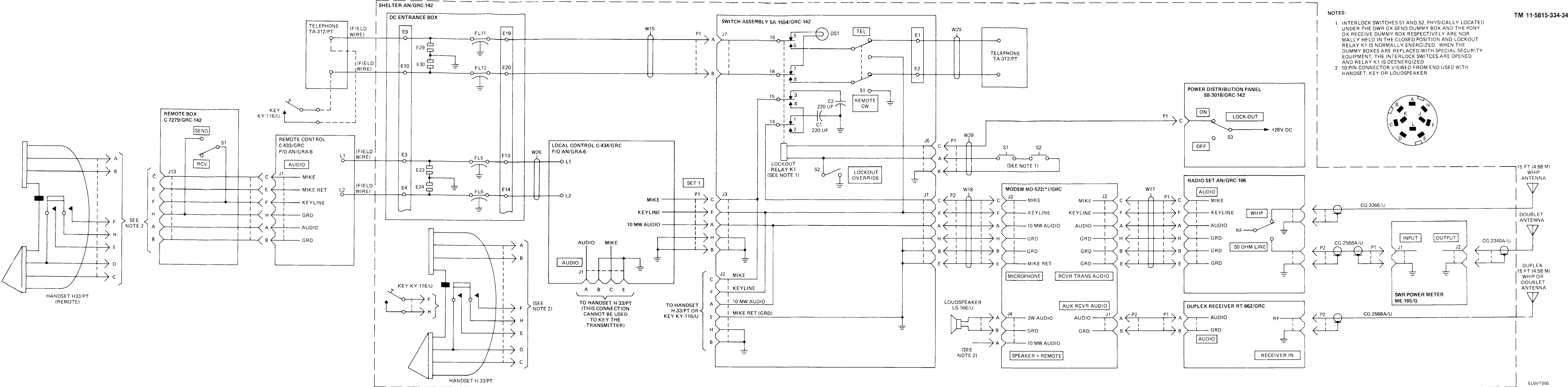
2. LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS MIL-C-5, MIL-C-25D, MIL-C-11272P, AND MIL-C-10950C RESPECTIVELY

3. LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D

4. TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE

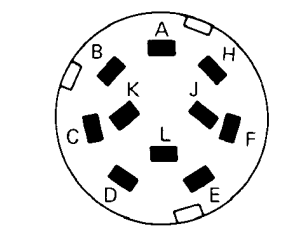
\* OPTIONAL CODING WHERE METALLIC PIGMENTS ARE UNDESIRABLE

FO-3. Military Standard Resistor, Inductor, and Capacitor Color Code Markings.

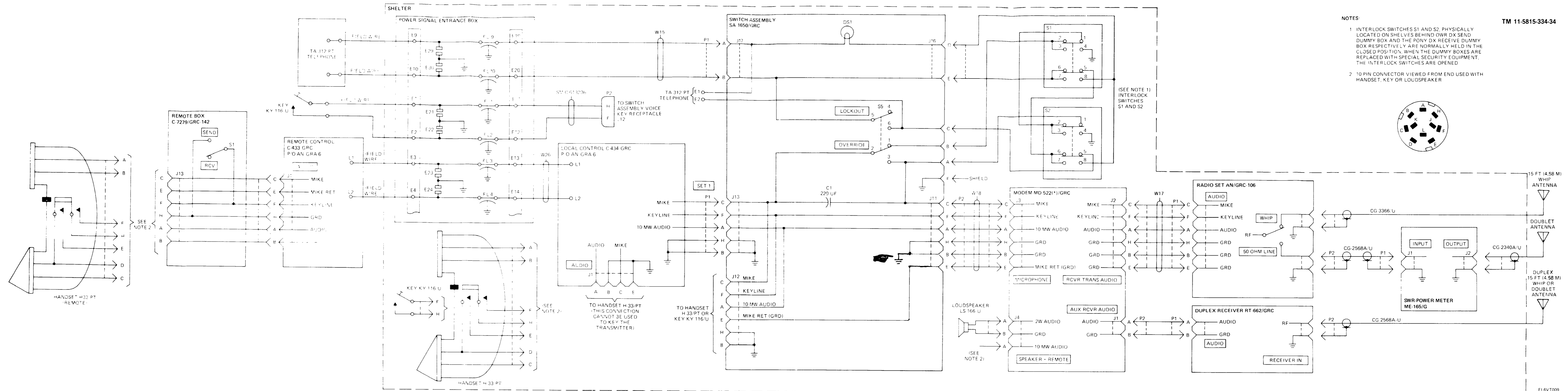


NOTES:

1. INTERLOCK SWITCHES S1 AND S2, PHYSICALLY LOCATED UNDER THE OWR DX SEND DUMMY BOX AND THE PONY DX RECEIVE DUMMY BOX RESPECTIVELY ARE NORMALLY HELD IN THE CLOSED POSITION AND LOCKOUT RELAY K1 IS NORMALLY ENERGIZED. WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT, THE INTERLOCK SWITCHES ARE OPENED AND RELAY K1 IS DEENERGIZED.
2. 10 PIN CONNECTOR VIEWED FROM END USED WITH HANDSET, KEY OR LOUDSPEAKER.

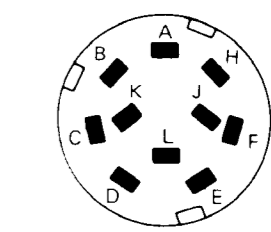


FO-4. Radio Teletypewriter Sets AN/GRC-122/142 Plain and C Models Voice, Telephone, and CW Circuits Schematic Diagram

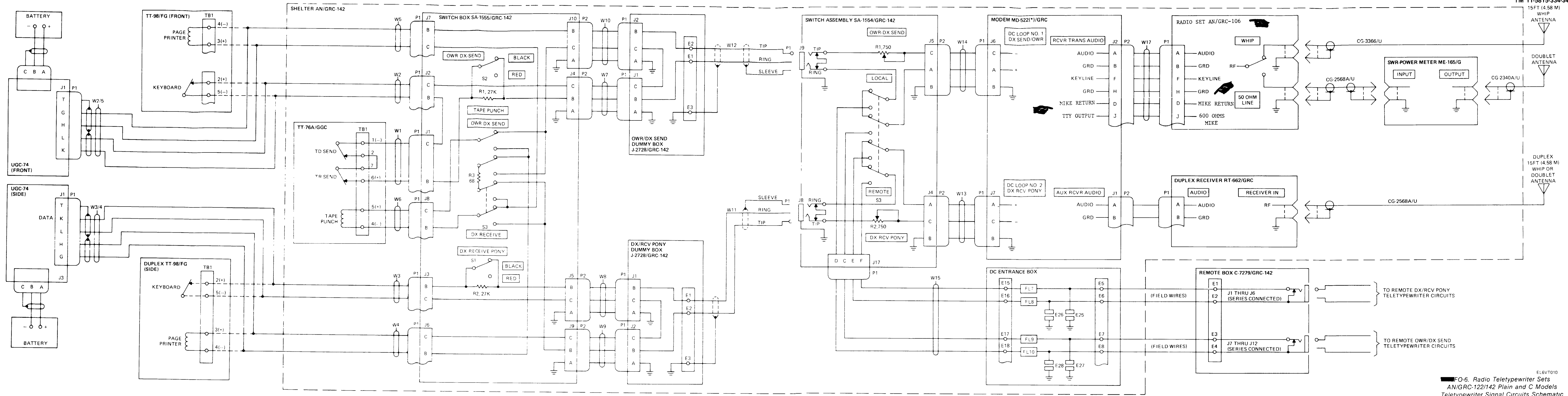


**NOTES:**

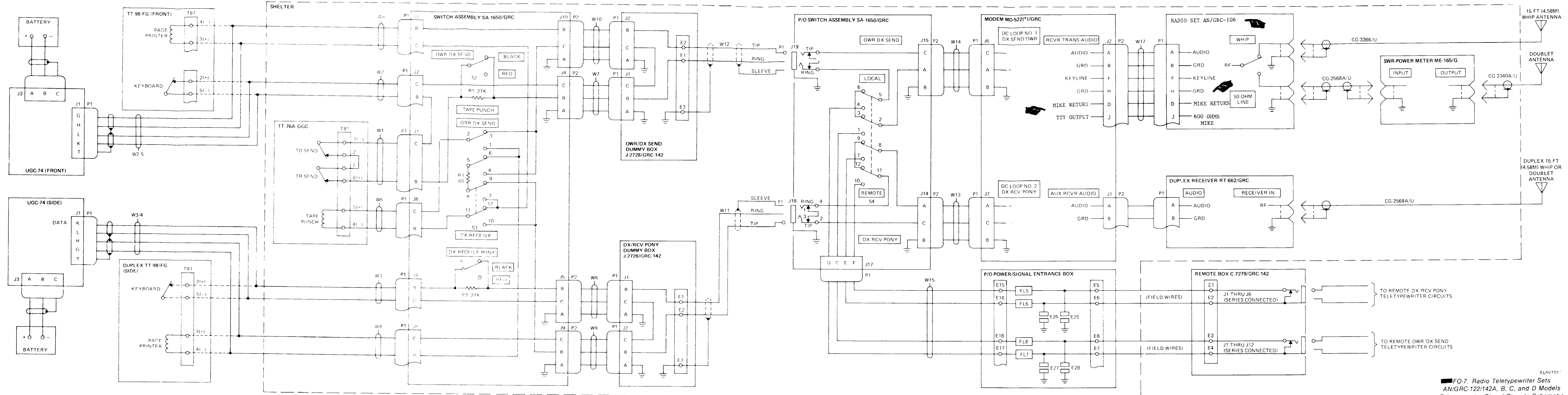
- INTERLOCK SWITCHES S1 AND S2, PHYSICALLY LOCATED ON SHELVES BEHIND DX SEND DUMMY BOX AND THE PONY DX RECEIVE DUMMY BOX RESPECTIVELY ARE NORMALLY HELD IN THE CLOSED POSITION. WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT, THE INTERLOCK SWITCHES ARE OPENED.
- 10 PIN CONNECTOR VIEWED FROM END USED WITH HANDSET, KEY OR LOUDSPEAKER



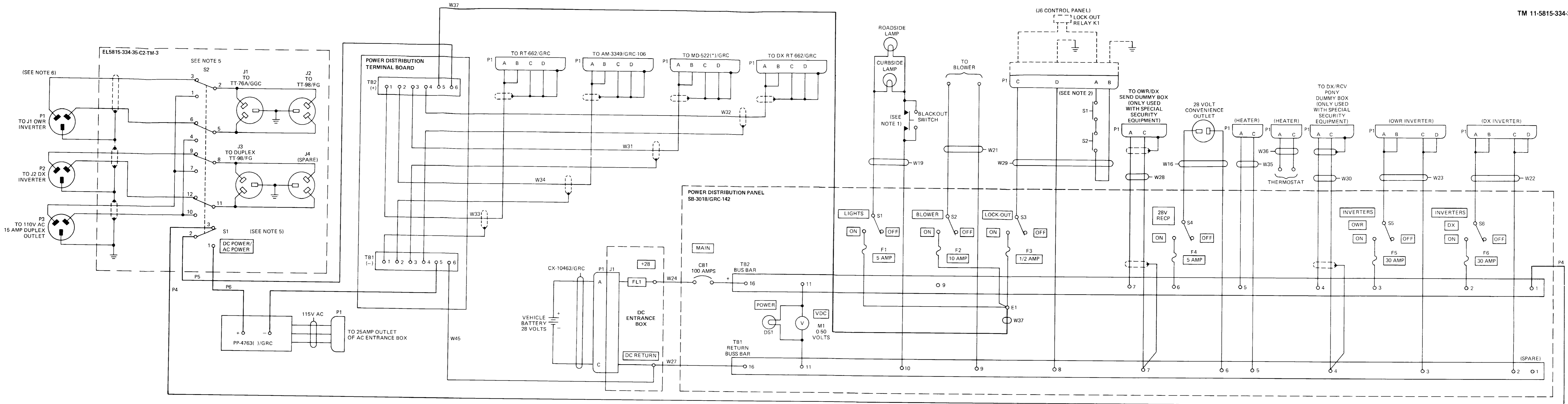
FO-5. Radio Teletypewriter Sets AN/GRC-122/142A, B, D, and E Models, Voice, Telephone, and CW Circuits Schematic Diagram.



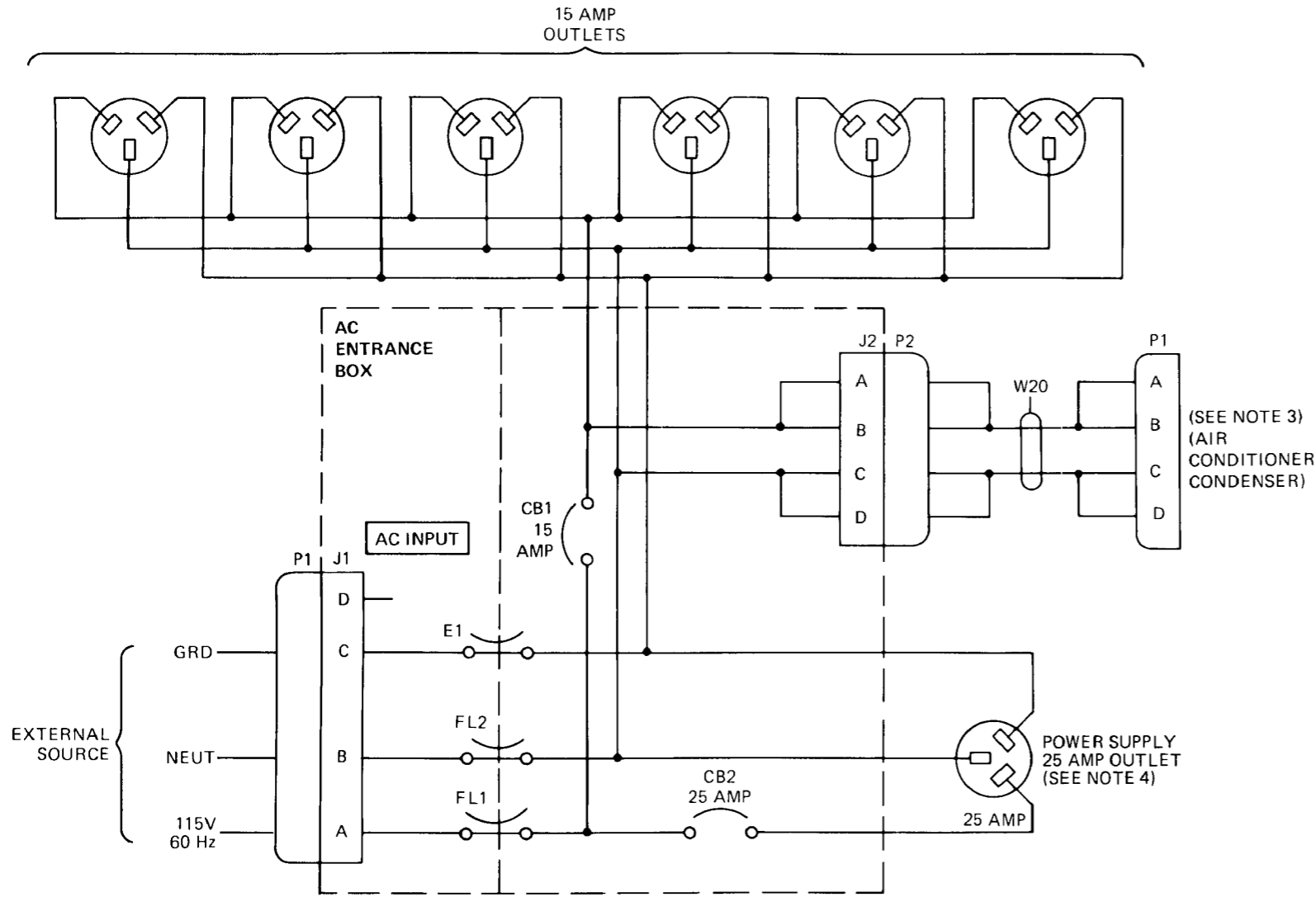
EL6VT010  
 FO-6. Radio Teletypewriter Sets  
 AN/GRC-122/142 Plain and C Models  
 Teletypewriter Signal Circuits Schematic  
 Diagram.



FO-7. Radio Teletypewriter Sets  
 AN/GRC-122/142A, B, C, and D Models  
 Teletypewriter Signal Circuits Schematic  
 Diagram.



EL6VT012  
 FO-8. Radio Teletypewriter Sets  
 AN/GRC-122/142 Plain and C Models  
 Power Wiring Schematic Diagram  
 (Sheet 1 of 2).



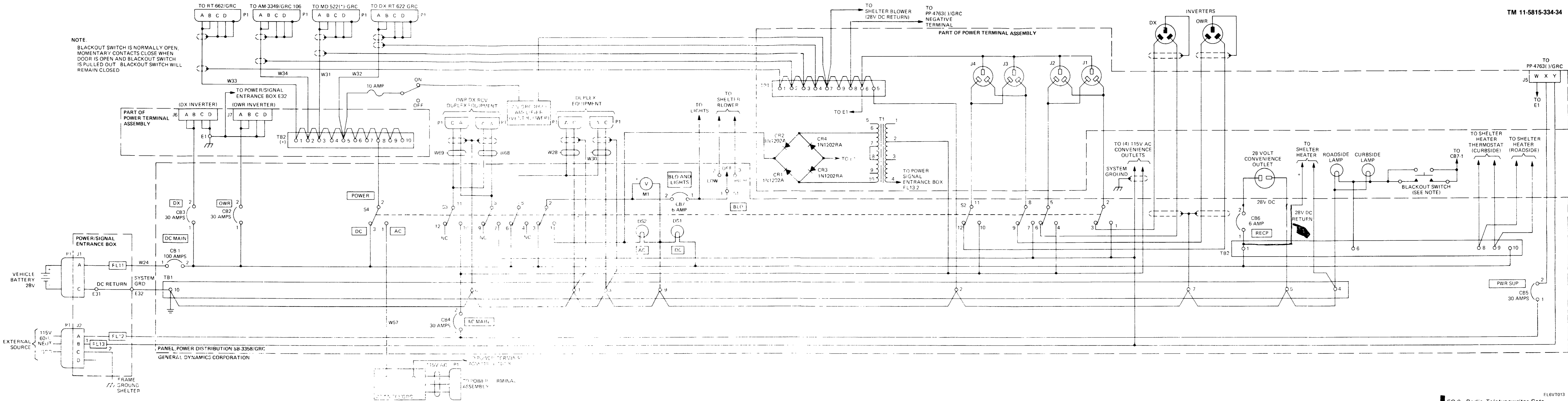
NOTES:

1. BLACKOUT SWITCH IS NORMALLY OPEN. WHEN SHELTER DOOR IS CLOSED, MOMENTARY CONTACTS CLOSE. WHEN DOOR IS OPEN AND BLACKOUT SWITCH IS PULLED OUT, BLACKOUT SWITCH WILL REMAIN CLOSED.
2. INTERLOCK SWITCHES S1 AND S2, PHYSICALLY LOCATED UNDER THE OWR/DX SEND DUMMY BOX AND THE PONY/DX RECEIVE DUMMY BOX RESPECTIVELY, ARE NORMALLY HELD IN THE CLOSED POSITION AND LOCKOUT RELAY K1 (IN THE CONTROL PANEL) IS NORMALLY ENERGIZED. WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT, THE INTERLOCK SWITCHES ARE OPENED AND RELAY K1 IS DEENERGIZED.
3. THE AIR CONDITIONER IS SUPPLIED WITH AN/GRC-142, SERIAL NUMBERS 1 THROUGH 697 ONLY.
4. POWER SUPPLY PLUGS INTO 25 AMP OUTLET TO SUPPLY DC VOLTAGE TO ELECTRONIC EQUIPMENT WHEN OPERATING IN AC ONLY.
5. SWITCHES SHOWN IN **DC POWER** POSITION.
6. P1, P2, AND P3 REFER TO PENDANT PLUGS TERMINATING INDICATED CABLES. P4, P5, AND P6 REFER TO LUGS TERMINATING INDICATED CABLES.

EL6VT022

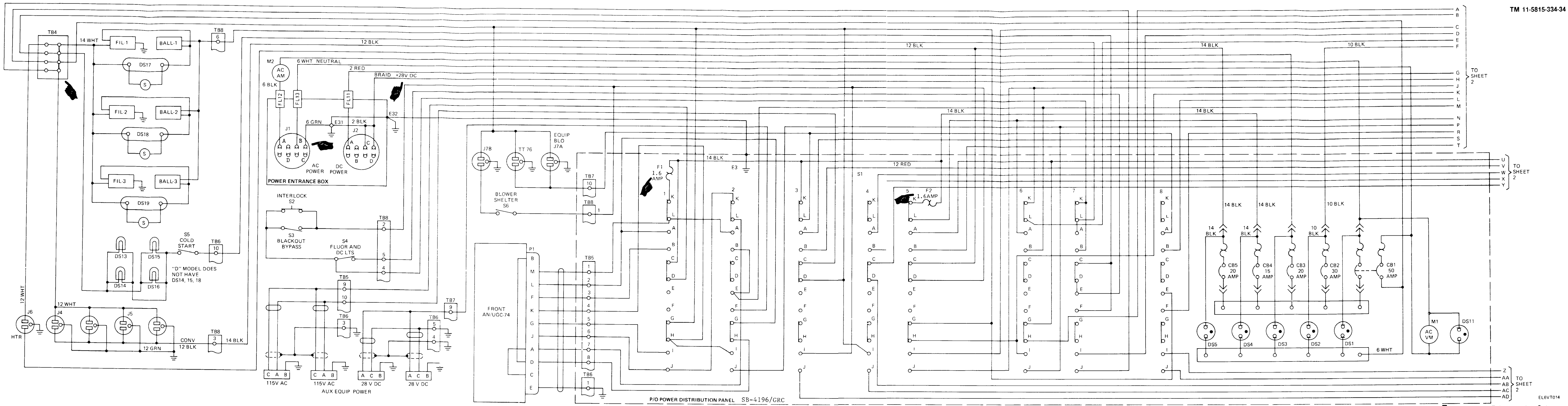
FO-8. Radio Teletypewriter Sets  
 AN/GRC-122/142 Plain and C Models  
 Power Wiring Schematic Diagram  
 (Sheet 2 of 2).

NOTE:  
BLACKOUT SWITCH IS NORMALLY OPEN, MOMENTARY CONTACTS CLOSE WHEN DOOR IS OPEN AND BLACKOUT SWITCH IS PULLED OUT BLACKOUT SWITCH WILL REMAIN CLOSED



FO-9. Radio Teletypewriter Sets  
A and B Models Power  
Wiring Diagram.





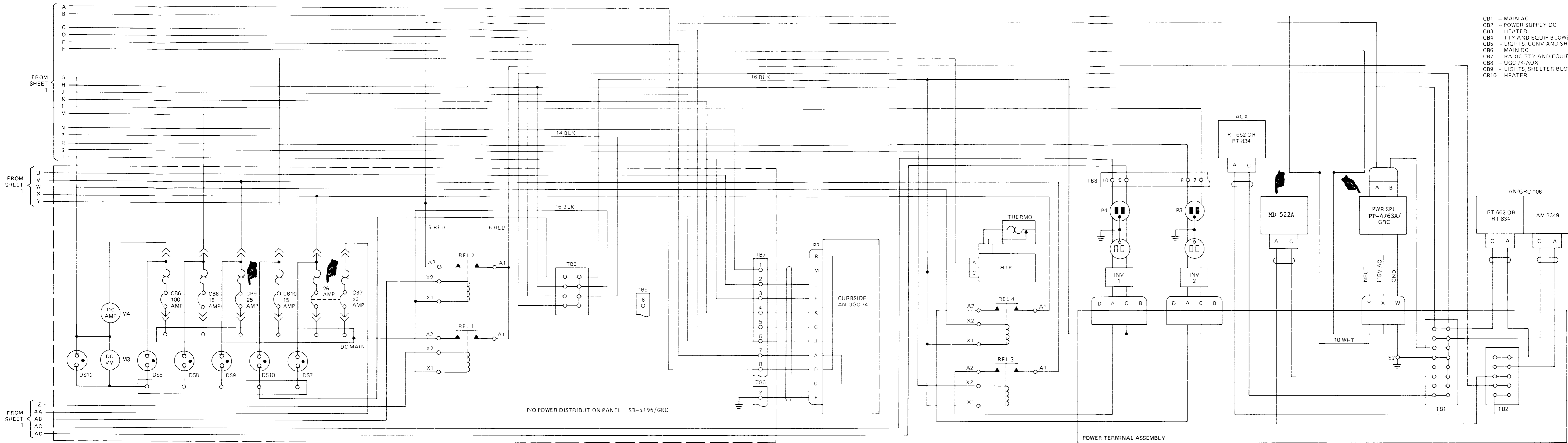
TO SHEET 2

TO SHEET 2

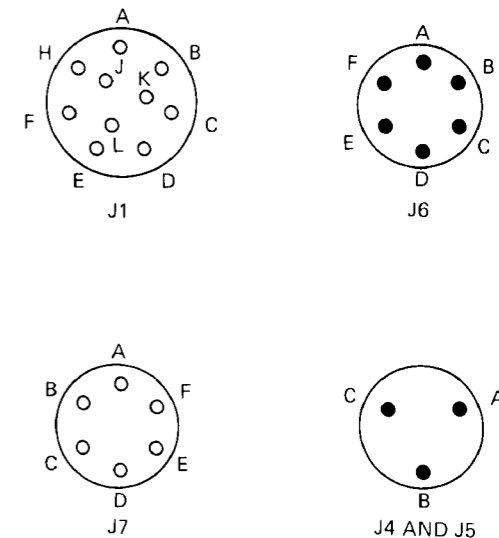
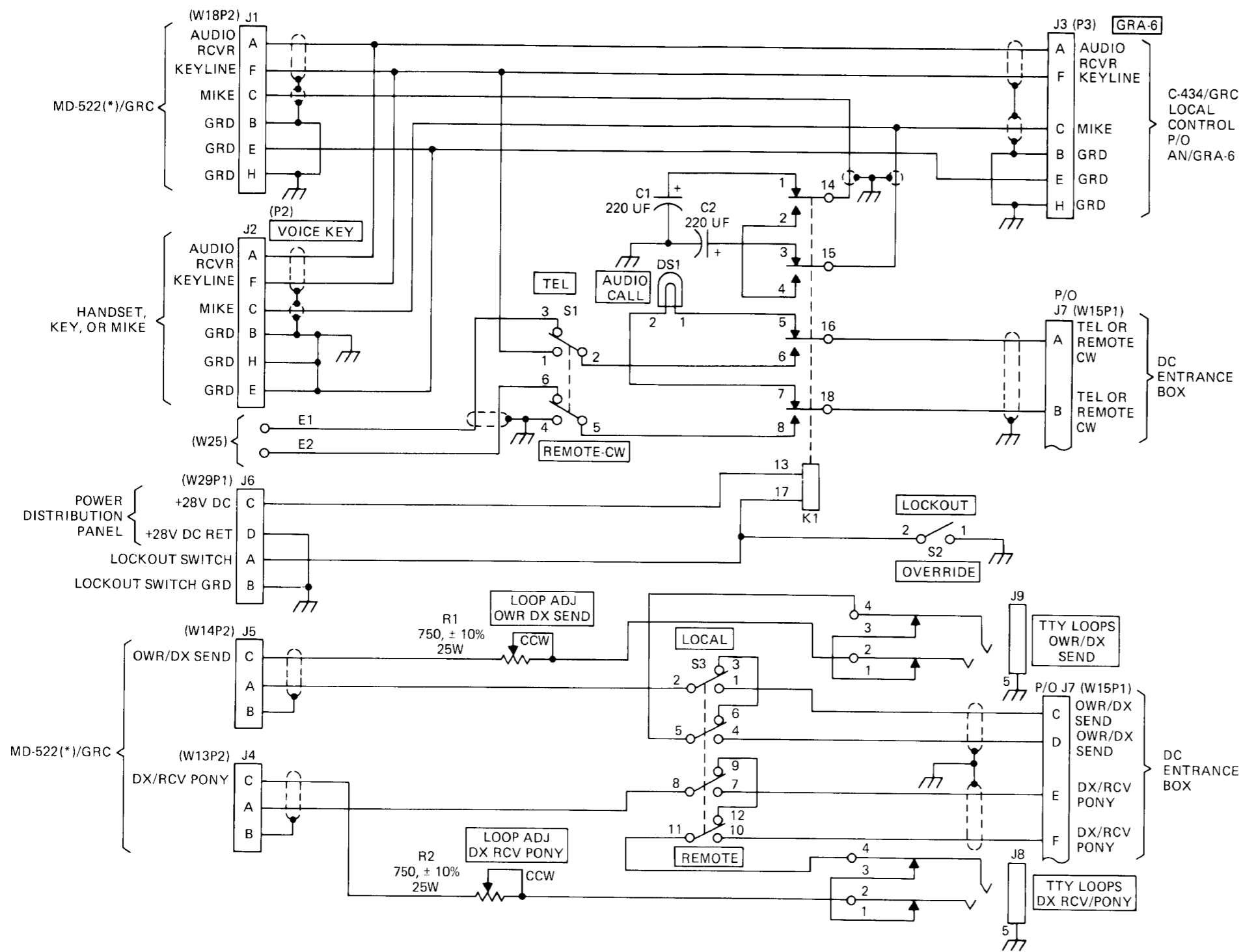
TO SHEET 2

FO-10. Radio Teletypewriter Sets AN/GRC-122/142D and E Models Power Wiring Diagram (Sheet 1 of 2).

- CB1 - MAIN AC
- CB2 - POWER SUPPLY DC
- CB3 - HEATER
- CB4 - TTY AND EQUIP BLOWER
- CB5 - LIGHTS, CONV AND SHELTER BLOWER
- CB6 - MAIN DC
- CB7 - RADIO TTY AND EQUIP BLOWER
- CB8 - UGC 74 AUX
- CB9 - LIGHTS, SHELTER BLOWER
- CB10 - HEATER

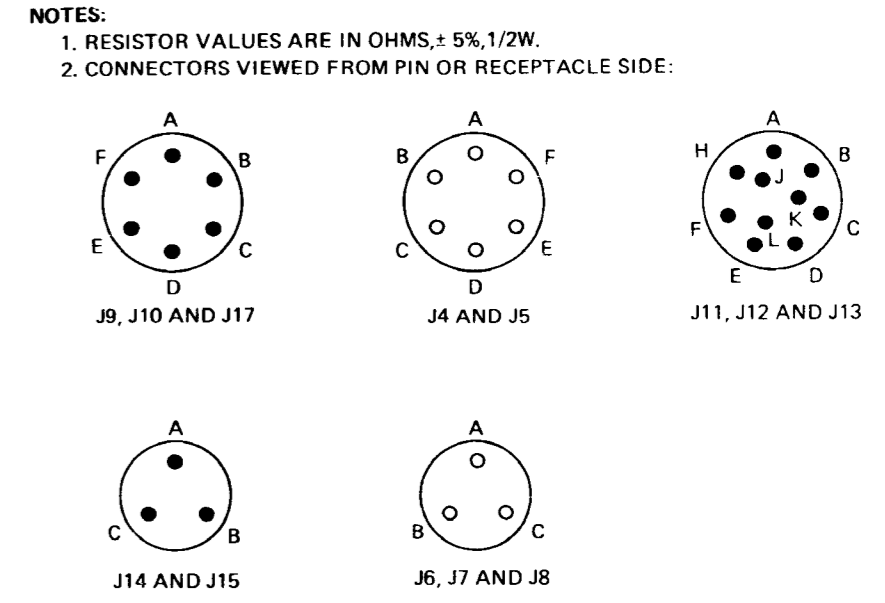
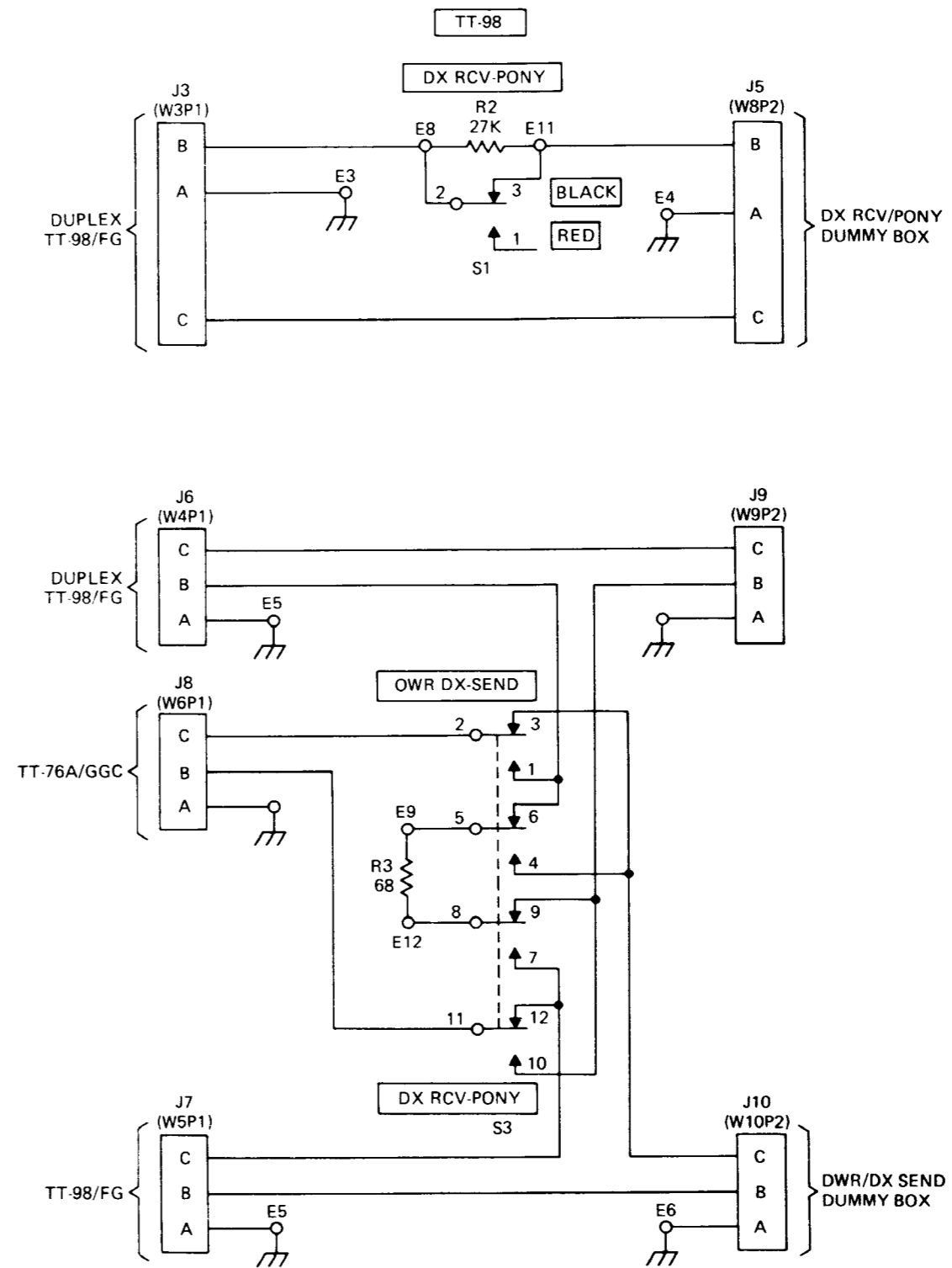
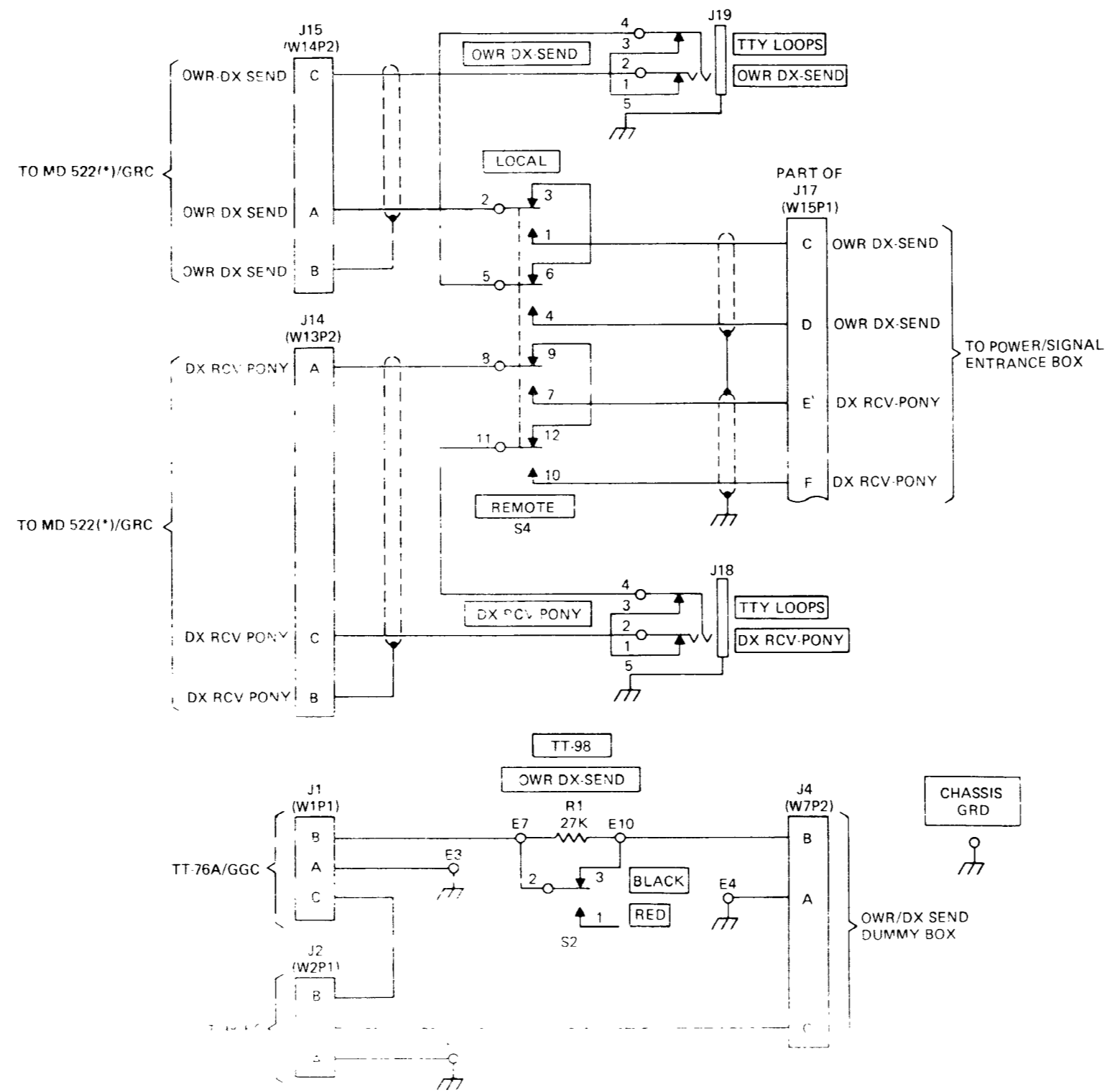
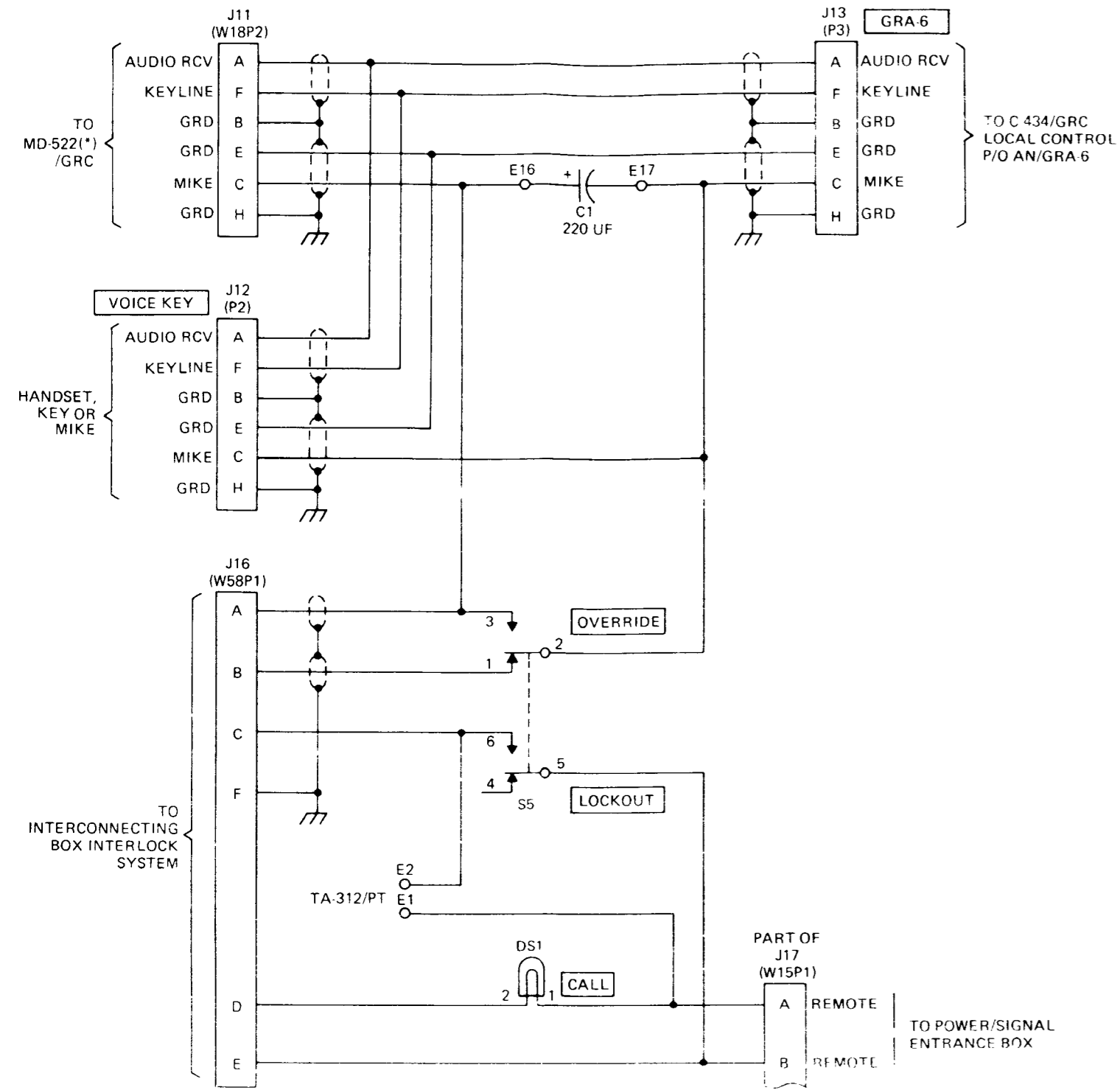


EL6V1023  
 FO-10. Radio Teletypewriter Sets  
 AN/GRC-122/142D and E Models Power  
 Wiring Diagram (Sheet 2 of 2).

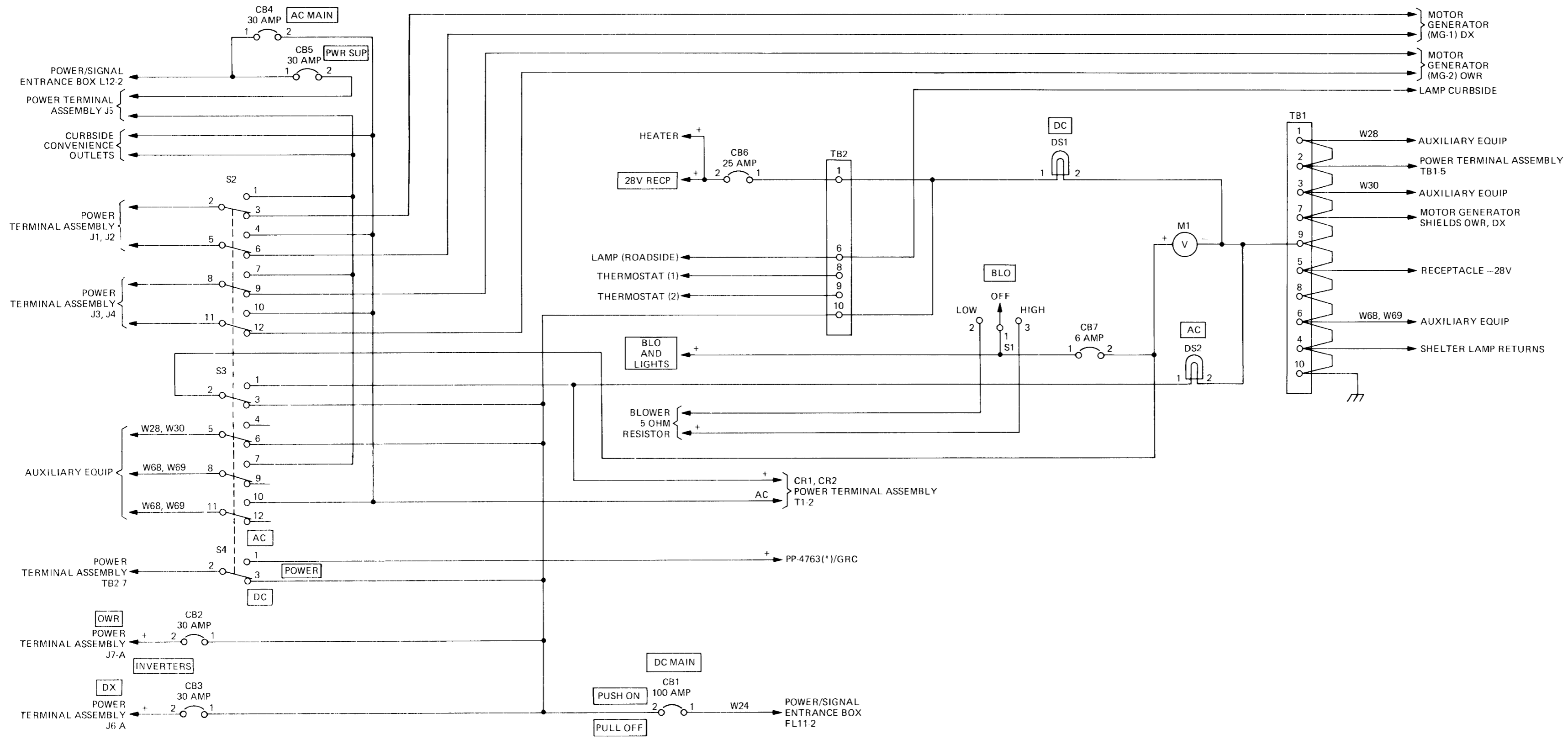


FO-11. Radio Teletypewriter Sets  
AN/GRC-122/142 Plain and C Models  
Switch Assembly SA-1554/GRC-142  
Schematic Diagram.

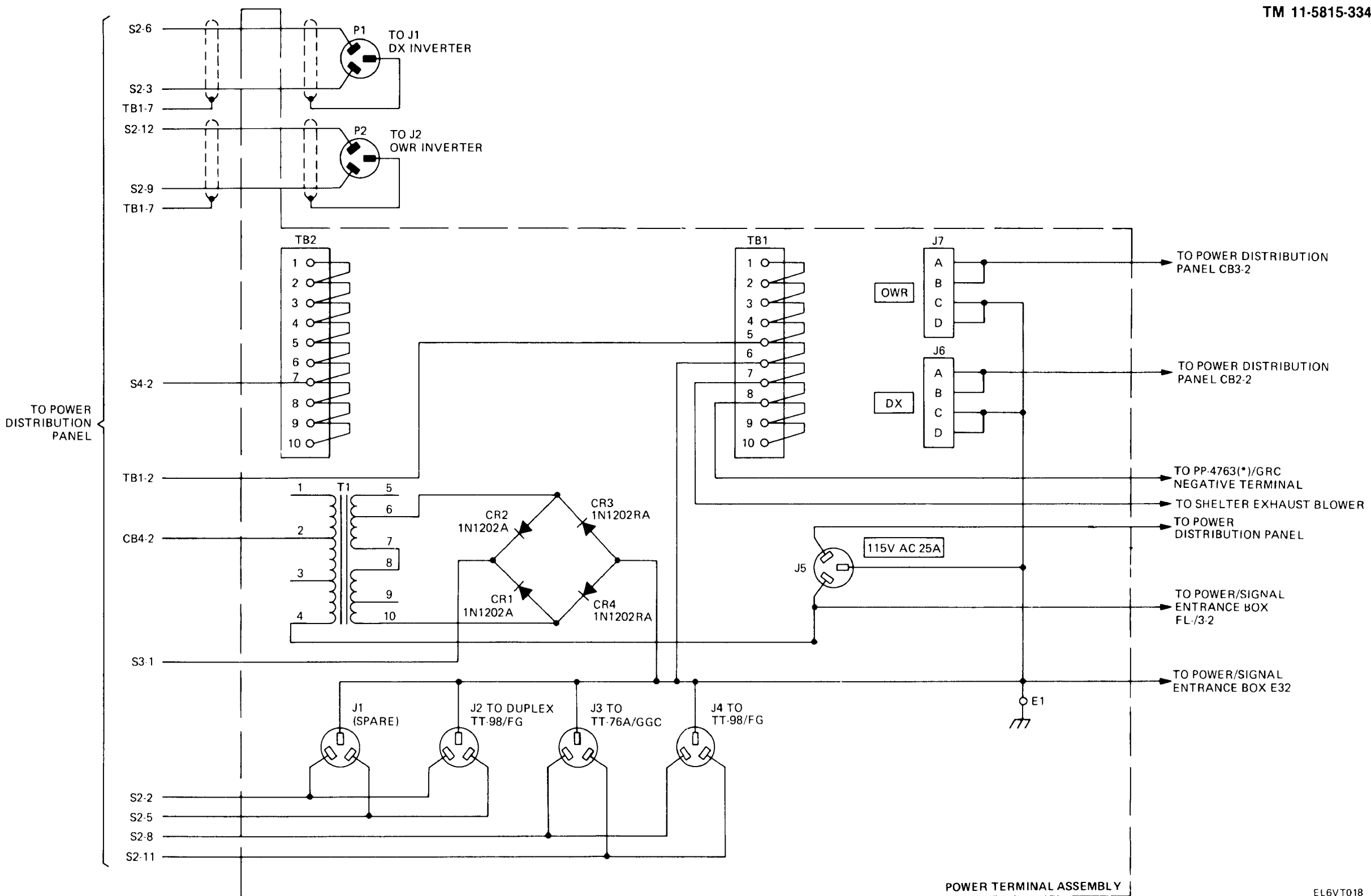
EL6VT015



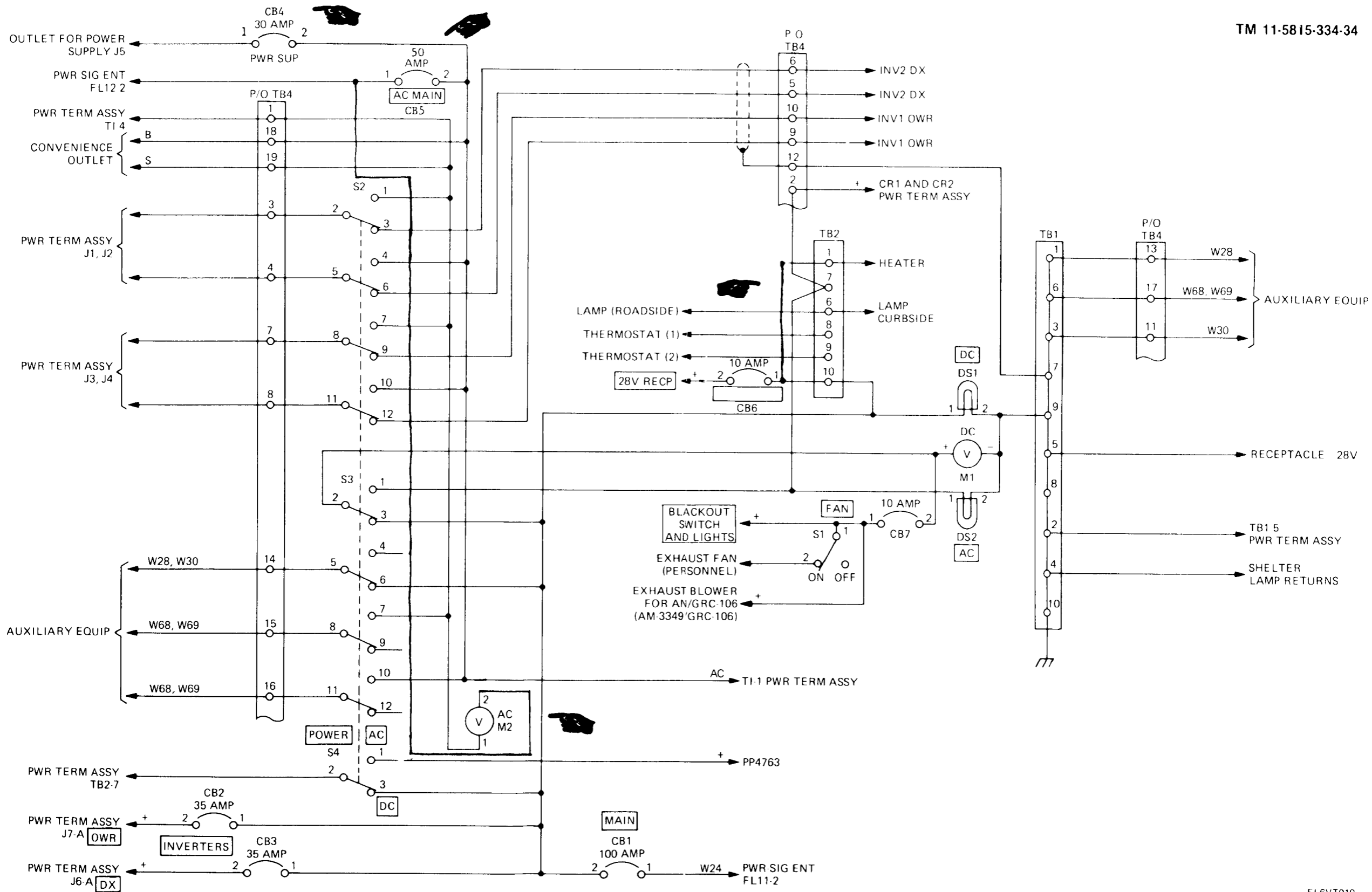
EL6VT016  
**FO-12. Radio Teletypewriter Sets AN/GRC-122/142A, B, D, and E Models Switch Assembly SA-1650/GRC Schematic Diagram.**



EL6VT017  
 FO-13. Radio Teletypewriter Sets  
 AN/GRC-122/142A and B Models Power  
 Distribution Panel SB-3358/GRC Schematic  
 Diagram.

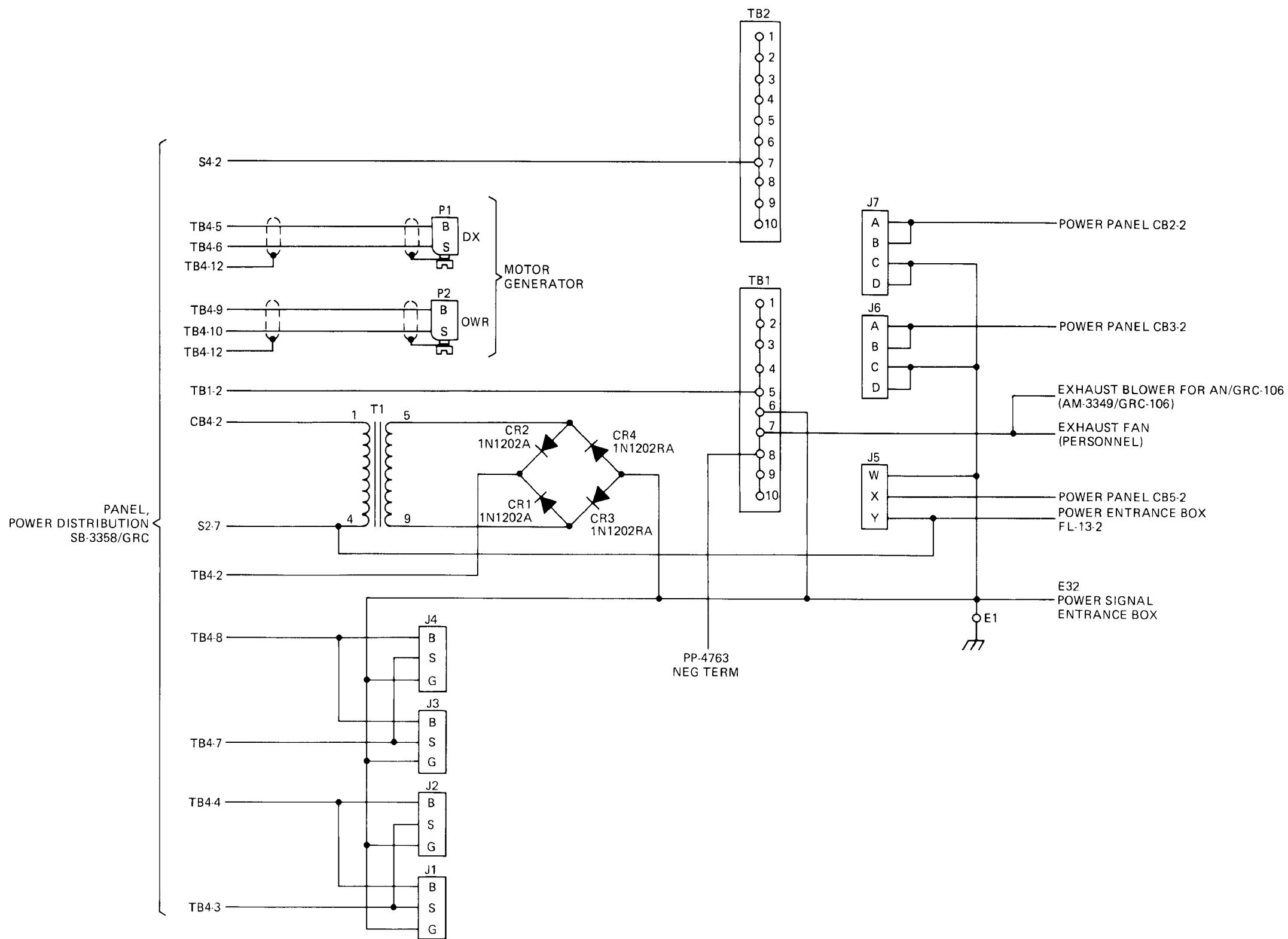


FO-14. Radio Teletypewriter Sets AN/GRC-122/-142 A and B Models Power Terminal Assembly Schematic Diagram.



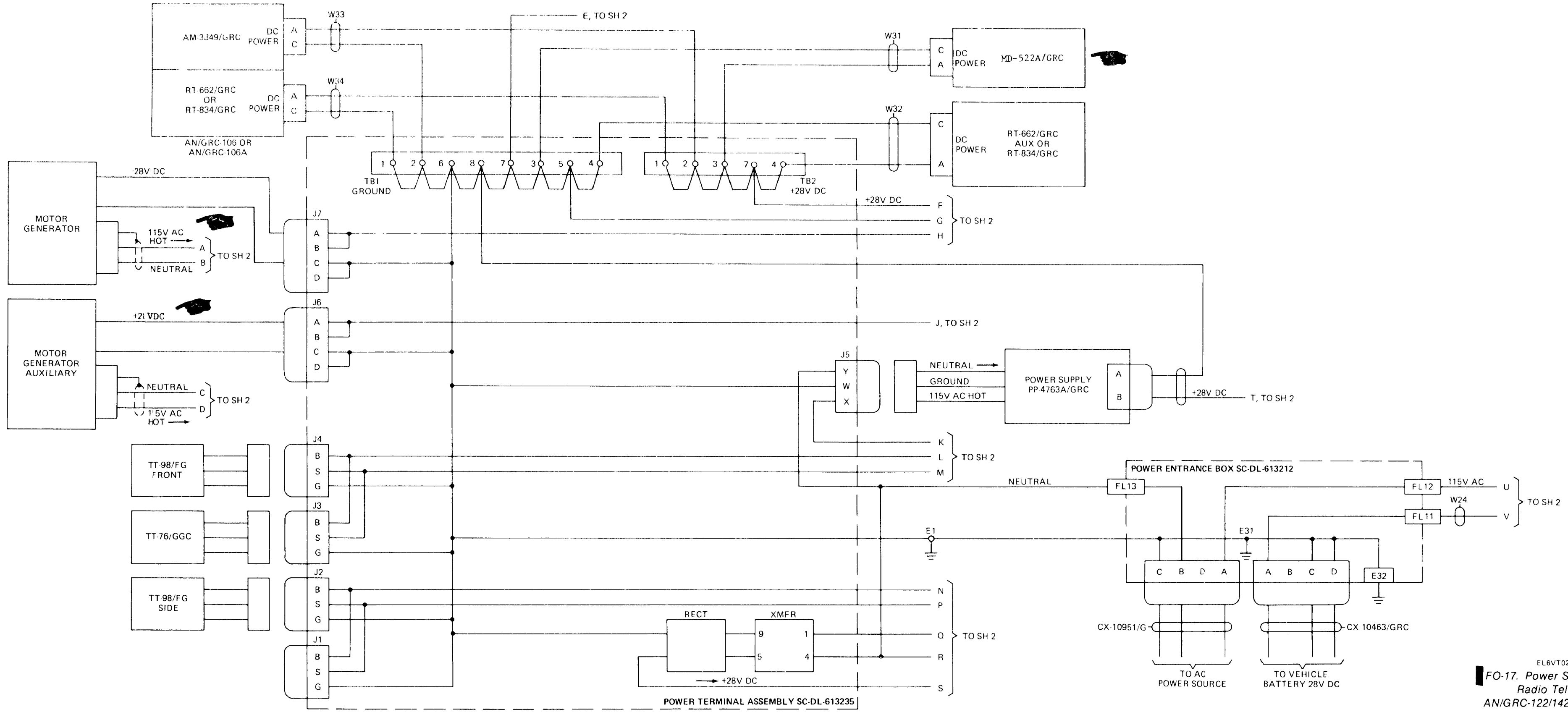
FO-15. Power Distribution Panel  
SB-3358/GRC Electrical Schematic  
Diagram in LEK Shelter Facility.

F16VT019

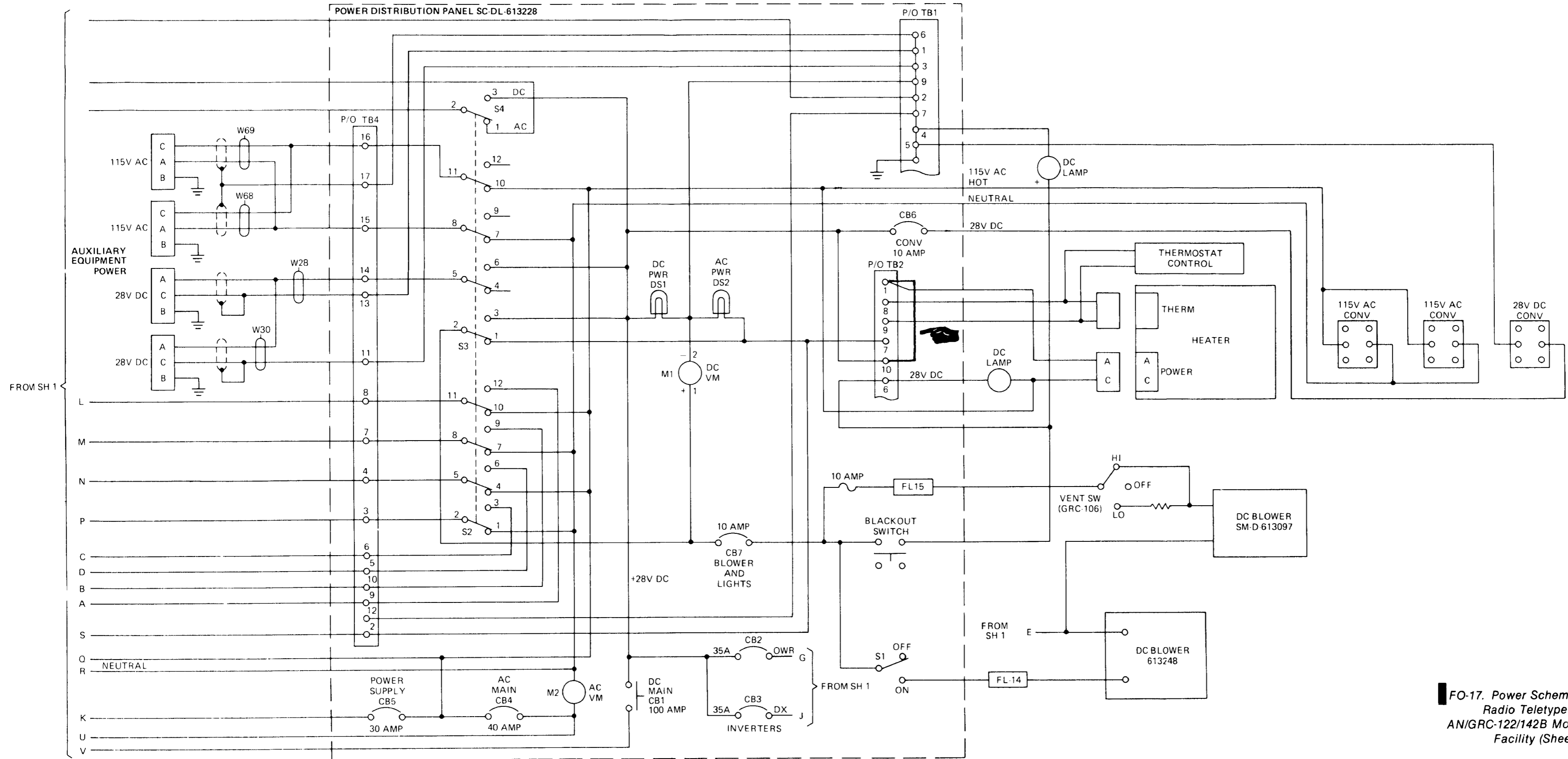


EL6VT020  
FO-16. LEK Power Distribution Panel  
SB-3358/GRC.



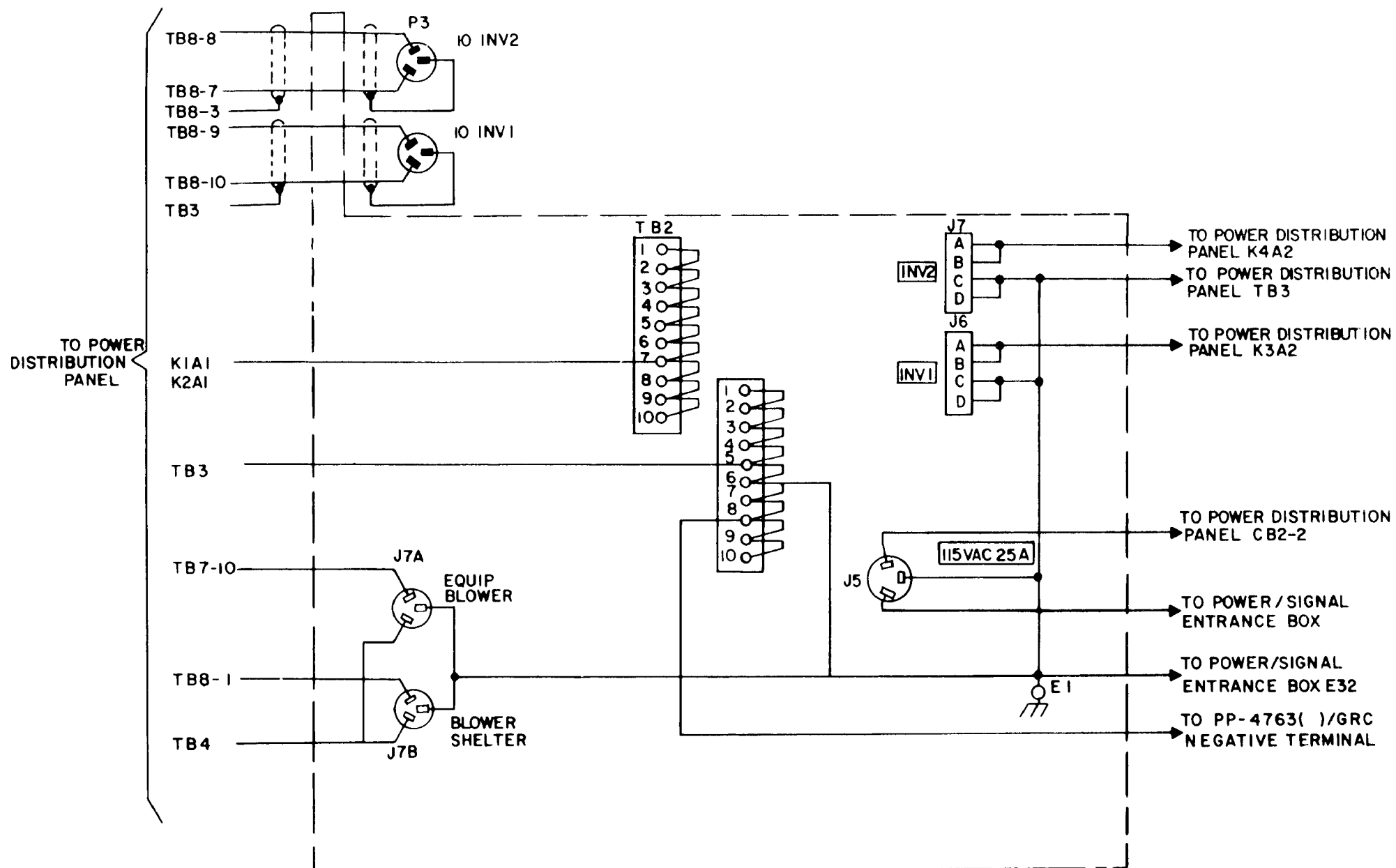


EL6VT021  
**FO-17. Power Schematic Diagram for**  
**Radio Teletypewriter Sets**  
**AN/GRC-122/142B Models LEK Shelter**  
**Facility (Sheet 1 of 2).**



FO-17. Power Schematic Diagram for Radio Teletypewriter Sets AN/GRC-122/142B Models LEK Shelter Facility (Sheet 2 of 2).

EL6VT077



FO-18. Radio Teletypewriter Sets  
AN/GRC-122/-142 D and E Models  
Power Terminal Assembly  
Schematic Diagram.

By Order of the Secretary of the Army:

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

Official:

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*Brigadier General, United States Army*  
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33				For item 2, change the NSN to read: 5835-00-134-9186. Reason: Accuracy.
44		19		Identify the cover on the junction box (item no. 5). Reason: It is a separate item and is not called out on figure 19.
45				Add the cover of the junction box as an item in the listing for figure 19. Reason: Same as above

SAMPLE

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TEAR ALONG PERFORATED LINE



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THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

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BE EXACT... PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
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IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

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TEAR ALONG PERFORATED LINE

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US Army Communications-Electronics Command  
and Fort Monmouth  
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# THE METRIC SYSTEM AND EQUIVALENTS

## WEIGHT MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches  
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches  
 1 Kilometer = 1000 Meters = 0.621 Miles

## WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces  
 1 Kilogram = 1000 Grams = 2.2 lb.  
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

## LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces  
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

## SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches  
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet  
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

## CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches  
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

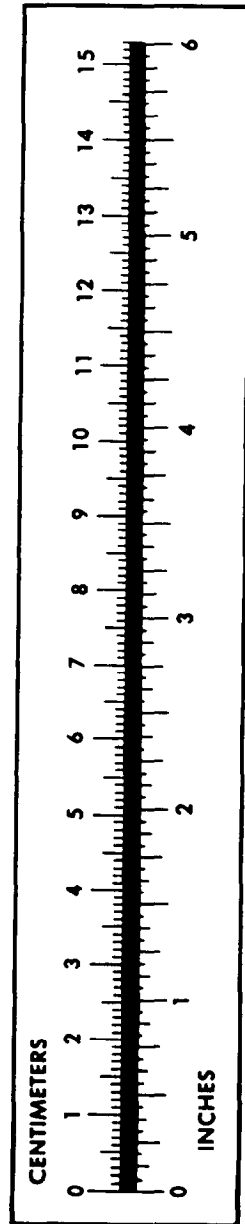
## TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 212° Fahrenheit is equivalent to 100° Celsius  
 90° Fahrenheit is equivalent to 32.2° Celsius  
 32° Fahrenheit is equivalent to 0° Celsius  
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

## APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
its	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
meters per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621





**PIN: 057431-002**