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11-5815-204-20

TM 11-5815-204-20

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE
SECOND ECHELON

RADIO TELETYPEWRITER SETS AN/GRC-46 AND AN/VRC-29

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HEADQUARTERS, DEPARTMENT OF THE ARMY
SEPTEMBER 1959

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WARNING

DON'T TAKE CHANCES!

EXTREMELY DANGEROUS VOLTAGES
EXIST IN THE FOLLOWING UNITS
OF RADIO TELETYPEWRITER SETS
AN/GRC–46 AND AN/VRC–46

Radio Transmitter T–195/GRC–19 **1,000 volts**

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TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL, RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AND AN/VRC-29

TM 11-5815-204-20
CHANGES No. 1

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *25 April 1960*

TM 11-5815-204-20, 11 September 1959, is changed as indicated so that the manual also applies to Radio Teletypewriter Set AN/GRC-46A.

Change the title of the manual to: ORGANIZATIONAL MAINTENANCE MANUAL, RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AND AN/VRC-29.

Page 2, chapter 1. Add the following Note below the title of chapter 1.

Note. Radio Teletypewriter Set AN/GRC-46A is similar to Radio Teletypewriter Set AN/GRC-46. Information in this manual applies to both sets unless otherwise specified

Page 8, paragraph 11. Delete the chart and substitute:

Cable nomenclature	AN/GRC-46 cable length (in.)	AN/VRC-29 cable length (in.)	Connects	
			From	To
CX-4542/U	107		Junction box POWER INPUT (on top).	Vehicular electrical system.
CX-4849/U		75		
CX-4543/U	123	Not required	Junction box BLOWER receptacle (on top).	Blower.
CX-4545/U	77		Junction box LIGHTS receptacle (on top).	Lights and door switch on AN/GRC-46. Lights on AN/VRC-29.
CX-4850/U		77		
CX-4540/U	54		Junction box CV-278 receptacle (on top).	Frequency-shift converter 27.5 VOLTS DC receptacle.
CX-4847/U		22		
CX-4540/U	38		Junction box MD-203 receptacle (on top).	Modulator 27.5 VOLTS DC receptacle.
CX-4847/U		22		
CX-4544/U	152	Not required	Junction box HEATER receptacle (on top).	Heater.
CX-4539/U	57	62	Junction box T-195 receptacle (on top).	Transmitter 24 VOLTS DC receptacle.
CX-4549/U	53	39	Junction box BATTERY receptacle (left side).	Teletypewriter (RED plug to positive jack, BLACK plug to negative jack).
CG-409C/U	51	39	Junction box MD-203 receptacle (left side).	Modulator KEYING INPUT receptacle.
CX-4546/U	45	76	Junction box TRANS CONTROL receptacle (left side).	Receiver AUDIO receptacle.
CX-4547/U	66		Junction box CV-278 receptacle (left side).	Frequency-shift converter PRINTER receptacle.
CX-4848/U		42		
CX-4541/U	83	37	Junction box ROTARY CONVERTER POWER INPUT TTY receptacle (right side).	Teletypewriter rotary converter dc terminals.
CX-4541/U	83	37	Junction box ROTARY CONVERTER POWER INPUT CRYPT receptacle (right side).	Crypt rotary converter dc terminals.

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Cable nomenclature	AN/GRC-46 cable length (in.)	AN/VRC-29 cable length (in.)	Connects	
			From	To
Cable and switch assembly.	.....	.....	Junction box MARK HOLD SEND REC switch receptacle (left side).	Remote mark-hold switch (part of assembly in AN/VRC-29).
CX-4551/U.....	89	40	Junction box TTY SIGNAL LINE receptacle (looking directly at right side of junction box, use receptacle on the extreme left).	Teletypewriter (black lead to terminal 1, white lead to terminal 2).
CX-4551/U.....	111	76	Reperforator REC receptacle.....	Teletypewriter (black lead to terminal 3, white lead to terminal 4).
CG-530B/U.....	35	17	Transmitter MO OUT receptacle....	Modulator MO INPUT receptacle.
CG-530B/U.....	35	17	Modulator FSK OUTPUT receptacle.	Transmitter FSK INPUT receptacle.
CG-1127/U.....	30	19	Receiver IF OUT receptacle.....	Frequency-shift converter INPUT receptacle.
Part of Teletypewriter Reperforator Transmitter TT-76(*)/GGC.	.....	.....	Reperforator (red plug).....	Junction box TTY SIGNAL LINE KW9 INPUT receptacle.
CX-4855/U.....	.....	109		
Part of Teletypewriter Reperforator Transmitter TT-76(*)/GGC.	.....	.....	Reperforator (gray plug).....	Junction box TTY SIGNAL LINE receptacle adjacent to the KW9 INPUT receptacle.
CX-4854/U.....	.....	109		
Part of Teletypewriter TT-98B/FG.	.....	.....	Teletypewriter.....	Teletypewriter rotary converter AC receptacle.
Part of Teletypewriter Reperforator Transmitter TT-77(*)/GGC	.....	.....	Reperforator.....	Teletypewriter rotary converter AC receptacle.
CG-1127/U.....	12	12	Transmitter RECEIVER ANTENNA receptacle.	Receiver ANT receptacle.
Part of Radio Set AN/GRC-19				
CX-1599/U.....	9	9	Transmitter RECEIVER CONT receptacle.	Receiver POWER INPUT receptacle.
Part of Radio Set AN/GRC-19				
CX-1573/U or				
CX-1852/U.....	72	72	Transmitter AUDIO receptacle.....	Microphone or telegraph key.
Part of Radio Set AN/GRC-19				
CX-1334/U.....	39	39	Receiver AUDIO receptacle.....	Headset or loudspeaker.
Part of Radio Set AN/GRC-19.				
Wire W-146.....	.....	.....	Transmitter WHIP ANTENNA receptacle.	Antenna.

Facing page 10, figure 5. Make the following changes:

After "CX-1573/U" and "CX-1852/U," add: (72″).

After "CG-1127/U" (between J616 of transmitter and J104 of receiver), change "(10″)" to: (12″).

After "CX-4540/U" (from J6 of junction box), change "(54)″" to: (38″).

After "CX-4540/U" (from J7 of junction box), change "(38″)" to: (54″).

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By Order of *Wilber M. Brucker*, Secretary of the Army:

L. L. LEMNITZER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

Def Atomic Spt Agcy (5)
USASA (2)
CNGB (1)
Tech Stf, DA (1) except
  CSigO (18)
Tech Stf Bd (1)
USA Arty Bd (1)
USA Armor Bd (1)
USA Inf Bd (1)
USA AD Bd (1)
USA Abn & Elct Bd (1)
USA Avn Bd (1)
USA ATB (1)
USCONARC (5)
US ARADCOM (2)
US ARADCOM Rgn (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5) except
  First US Army (7)
Corps (2)
Div (2)
USATC (2)
Svc Colleges (5)
Br Svc Sch (5) except
  USA Sig Sch (28)
GENDEP (2) except
  Atlanta GENDEP (none)
Sig Sec, GENDEP (10)
Sig Dep (17)
Army Pictorial Cen (2)
Engr Maint Cen (1)
USA Ord Mal Comd (3)
USASSA (15)
USASSAMRO (1)
USA Sig Pub Agcy (8)
USA Sig Engr Agcy (1)
USA Comm Agcy (3)
USA Sig Eqp Spt Agcy (7)
USA Sig Mal Spt Agcy (13)
WRAMC (1)
AFIP (1)
AMS (1)
Ports of Emb (OS) (2)
Trans Terminal Comd (1)
Army Terminals (1)
OS Sup Agcy (1)
Yuma Test Sta (2)
USA Elct PG (1)
Sig Lab (5)
Sig Fld Maint Shops (3)
USA Corps (Res) (1)
JBUSMC (2)
Units org under fol TOE:
  1-7 (2)
  1-17 (2)
  1-26 (2)
  1-57 (2)
  5-15 (2)
  5-16 (2)
  5-215 (2)
  5-216 (2)
  5-464 (2)
  6-100 (2)
  6-101 (2)
  6-125 (2)
  6-126 (2)
  6-146 (2)
  6-148 (2)
  6-150 (2)
  6-200 (2)
  6-201 (2)
  6-300 (2)
  6-301 (2)
  6-315 (2)
  6-316 (2)
  6-325 (2)
  6-326 (2)
  6-328 (2)
  6-401 (2)
  6-415 (2)
  6-416 (2)
  6-500 (EB, HJ) (2)
  6-501 (2)
  6-525 (2)
  6-535 (2)
  6-536 (2)
  6-545 (2)
  6-585 (2)
  6-611 (2)
  6-631 (2)
  6-634 (2)
  6-635 (2)
  7-11 (2)
  7-12 (2)
  7-25 (2)
  7-26 (2)
  7-31 (2)
  7-32 (2)
  7-52 (2)

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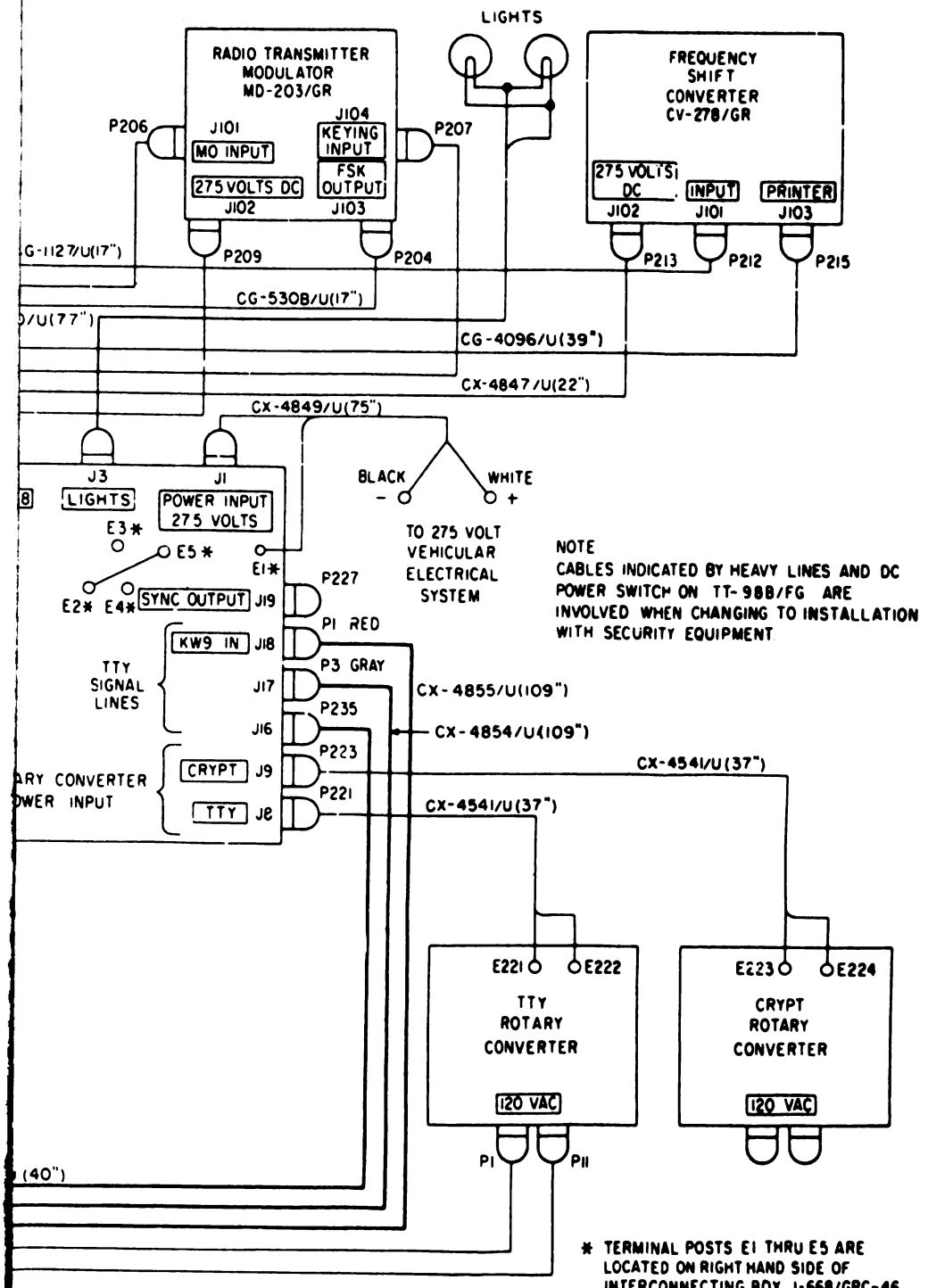
8-15 (2)
8-16 (2)
8-75 (2)
8-76 (2)
9-17 (2)
9-25 (2)
9-26 (2)
9-47 (2)
9-65 (2)
9-66 (2)
9-86 (2)
9-87 (2)
9-217 (2)
9-377 (2)
10-17 (2)
10-22 (2)
10-45 (2)
10-46 (2)
10-157 (2)
10-347 (2)
10-348 (2)
10-536 (2)
11-5 (2)
11-6 (2)
11-7 (2)
11-16 (2)
11-37 (2)
11-38 (2)
11-39 (2)
11-55 (2)
11-57 (2)
11-97 (2)
11-98 (2)
11-117 (2)
11-155 (2)
11-500 (AA-AE) (2)
11-555 (2)
11-557 (2)
11-587 (2)
11-592 (2)
11-597 (2)
17-2 (2)
17-22 (2)
17-25 (2)
17-26 (2)
17-45 (2)
17-46 (2)
17-65 (2)
17-66 (2)
17-77 (2)
17-85 (2)
17-86 (2)
39-51 (2)
39-61 (2)
39-71 (2)
39-72 (2)
44-12 (2)
44-15 (2)
44-16 (2)
44-35 (2)
44-36 (2)
44-85 (2)
44-86 (2)
44-115 (2)
44-116 (2)
44-435 (2)
44-436 (2)
44-437 (2)
44-445 (2)
44-447 (2)
44-448 (2)
44-500 (BA, BB) (2)
44-535 (2)
44-536 (2)
44-537 (2)
44-545 (2)
44-547 (2)
44-549 (2)
55-16 (2)
55-46 (2)
55-75 (2)
55-76 (2)
55-116 (2)
55-500 (AA-AE) (2)
55-10 (2)
57-5 (2)

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

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

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...age diagram for simplex connections

TM5815-204-20-CI-8

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TECHNICAL MANUAL

Organizational Maintenance Manual

RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AN/GRC-46B, AND AN/VRC-29

TM 11-5815-204-20
CHANGES No. 2

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *6 April 1961*

TM 11-5815-204-20, 11 September 1959, is changed as indicated so that the manual also applies to Radio Teletypewriter Set AN/GRC-46B.

Change the title of the manual to read as above.

Note. The parenthetical reference to previous changes (example "page 1 of C 1") indicates that pertinent material was published in those changes.

Page 2. Delete the note below the title of Chapter 1 (page 1 of C1), and substitute:

Note. Radio Teletypewriter Sets AN/GRC-46A and AN/GRC-46B are similar to Radio Teletypewriter Set AN/GRC-46. Information in this manual applies to all sets unless otherwise specified.

Paragraph 1, line 6. Between "AN/GRC-46" and "and AN/VRC-29" add the following: AN/GRC-46A, AN/GRC-46B.

2. Comments

(Superseded)

a. Parts List Form. Forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manuals 7, 8 or 9) direct to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-ML, Fort Monmouth, N.J., with comments on parts listings in appendix II.

b. Comments on Manual. Forward all other comments concerning this manual direct to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-PA2d, Fort Monmouth, N.J.

Paragraph 4*b*, chart. After last item, add:

Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Weight (lb)	Contents
19⅛	7⅛	9⅛	0.9	7⅝	Interconnecting Box J-1195/GRC-46.

Page 7, paragraph 8*a*, line 3. Delete "Shelter S-89C" and substitute: the shelter.

Paragraph 9. Make the following changes: Delete subparagraph *a* and substitute:

a. Refer to the applicable manual for Radio Set AN/GRC-19 for installation of the antenna.

In subparagraph *b*(1), line 2, delete "(figure 10, TM 11-5815-204-10)."

Page 8. Delete paragraph 11 (page 1 of C 1) and substitute:

11. Cable Connections

For cable connections of Radio Teletypewriter Sets AN/GRC-46 and AN/VRC-29, see TM 11-5815-204-10.

Figure 5 (fold-out), facing page 10, caption. After "*AN/GRC-46*" add: *and AN/GRC-46A.*

Page 13, paragraph 16. Delete subparagraph *c*.

Page 15, paragraph 18*c*, chart, "Action or condition" column. In Step No. 8, delete the period after "WHIP."

Page 17, paragraph 18*c*, chart, "Action or condition" column. Make the following changes: Step No. 39, add: In the AN/GRC-46B, connected between the RED REC jack on the KWB-9/TSEC and terminals 3 and 4 of the teletypewriter. Step No. 46, line 4, change "pun" to: pin.

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After Step No. 47, add:

Step No.	Unit	Action or condition	Normal indication	Corrective measures
	Interconnecting Box J-1195/GRC-46 (AN/GRC-46B).			
47.1	Cables	Refer to TM 11-5815-204-10.		
47.2	D OFF-P-E-D ON switch	Set to P-E-D ON.		
47.3	SIGNAL LINE CURRENT ADJUST.	Turn maximum clockwise.		
47.4	OFF-LINE CURRENT ADJUST	Turn maximum counterclockwise.		
	Security Equipment KWB-9/TSEC.			
47.5	Refer to security equipment technical manual for preparatory settings of security equipment.			

After Step No. 51 add:

Step No.	Unit	Action or condition	Normal indication	Corrective measures
	Interconnecting Box J-1195/GRC-46 (AN/GRC-46B).			
51.1	D OFF-P-E-D ON switch	Set to D OFF.		
51.2	SIGNAL LINE CURRENT ADJUST	Not adjusted.		
51.3	OFF-LINE CURRENT ADJUST	Set for a 60 ma indication on the line current meter in the KWB-9/TSEC unit.		

Page 22, paragraph 18c. chart. After Step No. 105, add:

Step No.	Unit	Action or condition	Normal indication	Corrective measures
	Modified Teletypewriter Reperforator TT-76(*)/GGC in AN/GRC-46B.			
105.1	TD ON switch	Press switch	Transmitter-distributor should start and send tape message.	Check switch.

Page 28, subparagraph 22*g*. Add the following:

g.1. *Material Requirements for Packaging Interconnecting Box J-1194/GRC-46.*

Material	Quantity
Slotted corrugated carton (7" x 5" x 5")	1
Cellulose wadding (24" x 12")	1
Neutral paper (28" x 18")	1
Kraft tape (3" wide)	58"

g.1. *Material Requirements for Packaging Interconnecting Box J-1195/GRC-46.*

Material	Quantity
Corrugated carton (19¼" x 8¼" x 7¼")	1
Filler (43" x 6")	1
Filler (43" x 2")	1
Foil bag (18" x 31½")	1
Corrugated carton (19¼" x 9¼"" x 7¼")	1
Neutral paper (42" x 18")	1
Kraft tape (3" wide)	76"
Pressure-sensitive tape (2" wide)	117"
Desiccant bag (16 oz)	1
Desiccant bag (4 oz)	1
Humidity indicator	1

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APPENDIX I (Superseded)
REFERENCES

Following is a list of applicable references that contain information applicable to the second echelon repairman of Radio Teletypewriter Sets AN/GRC-46, AN/GRC-46A, AN/GRC-46B, and AN/VRC-29

SB 38-100 Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army.

TM 11-806 Radio Transmitters T-195/GRC-19 and T-195A/GRC-19.

TM 11-2225 Teletypewriter Sets AN/GGC-3 and AN/GGC-3A and Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC and TT-76B/GGC.

TM 11-5410-201-12P Operator and Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Shelter, Electrical Equipment S-89C/G.

TM 11-5805-210-10 Operator's Manual: Frequency Shift Converter CV-278/GR.

TM 11-5805-210-20 Organizational Maintenance, Second Echelon: Frequency Shift Converter CV-278/GR.

TM 11-5805-295-12P Operator and Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Mountings MT-791/U and MT-791A/U.

TM 11-5815-200-10 Operator's Manual: Teletypewriter Sets AN/FGC-20, AN/FGC-20X, AN/FGC-21, AN/FGC-66, and AN/UGC-4 and Teleprinter TT-259/FG.

TM 11-5815-200-20P Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Teletypewriter Sets AN/FGC-20, AN/FGC-20X, AN/FGC-21, AN/UGC-4 and Teleprinter TT-259/FG.

TM 11-5815-204-10 Operator's Manual: Radio Teletypewriter Sets AN/GRC-46, AN/GRC-46A, AN/GRC-46B, and AN/VRC-29.

TM 11-5815-238-20P Organizational Maintenance Repair Parts and Special Tools List, Teletypewriter Set AN/GGC-3 and AN/GGC-3A; Reperforator Transmitters Teletypewriters TT-76/GGC, TT-76A/GGC and TT-76B/GGC.

TM 11-5815-266-20P Organizational Maintenance Repair Parts and Special Tools List: Converter, Frequency Shift CV-278/GR.

TM 11-5820-205-10 Operator's Manual: Radio Transmitter Modulator MD-203/GR.

TM 11-5820-205-20 Organizational Maintenance, Second Echelon: Radio Transmitter Modulator MD-203/GR.

TM 11-5820-205-20P Organizational Maintenance Repair Parts and Special Tools List: Radio Transmitter Modulator MD-203/GR.

TM 11-5820-295-10 Operator's Manual: Radio Set AN/GRC-19.

TM 11-5820-295-10P Operator's Maintenance Repair Parts and Special Tools List: Radio Set AN/GRC-19.

TM 11-5820-295-20 Organizational Maintenance: Radio Set AN/GRC-19.

TM 11-5820-295-20P Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Radio Set AN/GRC-19.

TM 11-5820-334-10 Operator's Manual, Radio Receiver R-392/URR.

TM 11-5820-334-20 Organizational Maintenance Manual, Radio Receiver R 392/URR.

TM 11-5820-334-20P Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Receiver, Radio R-392/URR.

TM 11-5820-335-10P Basic Issue Items List: Transmitter, Radio T-195/GRC-19.

TM 11-5820-335-20P Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart: Transmitter, Radio T-195/GRC.

TM 11-5965-222-15P Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Dynamic Loudspeaker LS-166/U.

TM 11-5815-204-20P Organizational Maintenance Repair Parts and Special Tools List, Radio Teletypewriter Set AN/GRC-46, AN/GRC-46A and AN/VRC-29.

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APPENDIX II (Superseded)
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions and repair operations to be performed by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or component.* Only the nomenclature or standard item name is annotated in this column. Additional descriptive data are included only where clarification is necessary to identify the part. Components and parts comprising a major end item are listed alphabetically. Assemblies and subassemblies are in alphabetical sequence with their components listed alphabetically immediately below the assembly listing.

(2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelon capable of performing the operations. These are defined as follows:

(*a*) *Service.* To clean, to preserve, and to replenish fuel and lubricants.

(*b*) *Adjust.* To regulate periodically to prevent malfunction.

(*c*) *Inspect.* To verify serviceability and to detect incipient electrical or mechanical failure, by scrutiny.

(*d*) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure, by use of special equipment, such as gages, meters, and other test devices.

(*e*) *Replace.* To substitute serviceable assemblies, subassemblies, and parts for unserviceable components.

(*f*) *Repair.* To restore to a serviceable condition by replacing unserviceable parts or by any other action required utilizing tools, equipment, and skills available, to include welding, grinding, riveting, straightening, adjusting, etc.

(*g*) *Aline.* To adjust two or more components of an electrical system so that their functions are properly synchronized.

(*h*) *Rebuild.* To restore to a condition comparable to new by disassembling the item to determine the condition of its component parts and reassembling it using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

(3) *1st, 2d, 3d, 4th, 5th echelon.* The symbol X indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.

(4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are defined as follows:

(1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, 5th echelon.* A dagger (†) indicates the echelons allocated the facility.

(3) *Tool code.* This column lists the tool code assigned.

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2. Maintenance by Using Organizations

When this equipment is used by Signal service organizations organic to theater headquarters or communications zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

3. Mounting Hardware

The basic entries of the maintenance allocation chart do not include mounting hardware, such as screws, nuts, bolts, washers, brackets, clamps, etc.

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Section II. MAINTENANCE ALLOCATION CHART

(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH	(4) 2ND ECH	(5) 3RD ECH	(6) 4TH ECH	(7) 5TH ECH	(8) TOOLS REQUIRED	(9) REMARKS
RADIO TELETYPEWRITER SET AN/GRC-46; AN/GRC-46A; AN/VRC-29	replace					X		
	repair			X			15	
	rebuild					X		
	service		X				14	
				X			15	
	adjust			X			15	
	inspect	X						
	inspect		X				14	
				X			15	
	test		X				6, 13	
	test			X			1, 4, 5, 8, 10, 11, 13	
	test				X		1, 2, 3, 4, 6, 8, 13 9, 11, 16	
	test					X	1, 2, 3, 4, 7, 8, 9, 11, 16 12	
	align			X			1, 4, 5, 10, 11, 15	
	align				X		1, 4, 6, 11, 15, 16	
	align					X	1, 4, 7, 11, 15, 16	
ADAPTER, CONNECTOR	replace		X					
ANTENNA MOUNTING ASSEMBLY (AN/GRC-16A only)	replace		X					
BLOWER (AN/GRC-46A only)	repair			X				
	replace			X				
BRACKET	replace					X		
CABLE ASSEMBLY	replace		X					
	repair			X				
ADAPTER, CABLE TO CONNECTOR	replace			X				
CABLE	replace			X				
CONNECTORS	replace			X				
CORD, ELECTRICAL	replace			X				
CLAMP, LOOP	replace		X					
CONVERTER, CV-278/GR	replace		X					Separate MAC
HEATER, INSTALLATION (AN/GRC-16A only)	replace		X					
	repair			X				
ADAPTER	replace				X			
BRACKET	replace				X			
CABLE SOLENOID ASSEMBLY	replace			X				

*GRC-46; AN/GRC-46A; AN/VRC-29

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(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH	(4) 2ND ECH	(5) 3RD ECH	(6) 4TH ECH	(7) 5TH ECH	(8) TOOLS REQUIRED	(9) REMARKS
AN/GRC-46; AN/GRC-46A; AN/VRC-29 (continued)								
CAPACITOR	replace			X				
CLAMP, HOSE	replace				X			
COCK, SHUTOFF	replace			X				
COIL	replace				X			
CONNECTOR	replace				X			
COUPLING	replace				X			
DIAPHRAGM ASSEMBLY	replace				X			
ELBOW AND BRACKET ASSEMBLY	replace					X		
ELBOW, PIPE	replace				X			
ELECTRODE IGNITER	replace		X					
FILTER, GASOLINE	replace				X			
FLANGE, PIPE	replace				X			
FUEL LINE	replace			X				
FUEL PUMP	replace				X			
FUSEHOLDER	replace			X				
FUSE	replace		X					
GASKET	replace				X			
HEATER SUB-ASSEMBLY	replace			X				
HOSE ASSEMBLY, METAL	replace		X					
HOSE ASSEMBLY, RUBBER	replace				X			
MOTOR, DC	replace			X				
MOUNT, RESILIENT	replace			X				
NIPPLE, PIPE	replace			X				
NOZZLE	replace				X			
SOCKET	replace			X				
SPRING	replace				X			
SWITCH, OVERHEAT	replace				X			
SWITCH, SENSITIVE	replace			X				
SWITCH, THERMOSTATIC	replace				X			
SWITCH, TOGGLE	replace			X				
TANK, FUEL	replace			X				
TUBING, COPPER	replace			X				
VIBRATOR	replace			X				
WIRE FABRIC	replace				X			
INSULATOR	replace		X					

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(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH	(4) 2ND ECH	(5) 3RD ECH	(6) 4TH ECH	(7) 5TH ECH	(8) TOOLS REQUIRED	(9) REMARKS
AN/GRC-46; AN/GRC-46A; AN/VRC-29 (continued)								
INTERCONNECTING BOX J-668/GRC-46	replace		X					
	repair			X			15	
	rebuild					X		
	service		X				14	
	inspect	X					14 or 15	Visual only at 1st
	test		X				8	
AMMETER	replace			X				
	repair					X		
	rebuild					X		
CAP, ELECTRICAL	replace		X					
CAPACITORS	replace			X				
CIRCUIT BREAKER	replace			X				
	repair			X				
CLIP, ELECTRICAL	replace			X				
COIL	replace			X				
CONNECTORS	replace			X				
COVER, FUSE	replace			X				
FUSES	replace	X						
FUSEHOLDERS	replace			X				
JACKS	replace			X				
KNOBS	replace		X					
POSTS, BINDING AND RETAINER	replace			X				
RELAYS	replace	X						
RESISTORS	replace			X				
RETAINERS, RELAY	replace		X					
SHAFT, LOCK	replace			X				
SOCKET	replace			X				
SWITCHES	replace			X				
TERMINALS	replace			X				
VOLTMETER	replace			X				
	repair					X		
	rebuild					X		
LIGHTING SYSTEM (AN/GRC-46A only)	replace		X					
	repair		X					
CABLE ASSEMBLY	replace		X					
	repair			X				

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(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH.	(4) 2ND ECH	(5) 3RD ECH.	(6) 4TH ECH	(7) 5TH ECH.	(8) TOOLS REQUIRED	(9) REMARKS
AN/GRC-46; AN/GRC-46A; AN/VRC-29 (continued)								
ADAPTER, CABLE TO CONNECTOR	replace			X				
CABLE	replace			X				
CONNECTOR	replace			X				
CORD ELECTRICAL	replace			X				
FIXTURE, LIGHT	replace		X					
LAMP, INCANDESCENT	replace	X						
REFLECTOR, LIGHT	replace		X					
SWITCH	replace			X				
SWITCH, LEVER	replace			X				
LOUDSPEAKER LS-166/U	replace		X					Separate MAC
MODULATOR MD-203/GR	replace		X					Separate MAC
MOTOR GENERATOR	service		X				14	
				X			16	
	adjust			X			16	
	test			X			8	
	replace		X					
	repair			X				
	rebuild					X		
BRUSH, ELECTRICAL CONTACT	replace			X				
CAPACITOR	replace			X				
COIL, R.F.	replace			X				
CONNECTOR	replace			X				

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(1) PART OR COMPONENT	(2) MAINTENANCE FUNCTION	(3) 1ST ECH	(4) 2ND ECH	(5) 3RD ECH	(6) 4TH ECH	(7) 8TH ECH	(8) TOOLS REQUIRED	(9) REMARKS
AN/GRC-46; AN/GRC-46A; AN/VRC-29 (continued)								
MOUNTING MT-791/U, MT-791A/U	replace		X					Separate MAC
RACK, ELECTRICAL EQUIPMENT (AN/GRC-46A only)	service		X				14	
				X			15	
	inspect	X						
	replace			X				
	repair				X			
	rebuild					X		
RADIO SET AN/GRC-19	replace		X					Separate MAC
REEL RL-29 (AN/GRC-46A only)	replace	X						
REPERFORATOR-TRANSMITTER TELETYPEWRITER TT-76/GGC	replace		X					Separate MAC
ROD, GROUND (AN/GRC-46A only)	replace	X						
SEATS (AN/GRC-46A only)	replace					X		
	repair			X				
SHELTER S-89C/GR (AN/GRC-46 only)	replace					X		Separate MAC
SHELTER (S-144 modified to house AN/GRC-46A)	replace					X		
	repair			X				
FILTER, AIR	replace			X				
HOUSING, CABLE	replace					X		
SEAL (for Louver)	replace			X				
TELETYPEWRITER SET AN/UGC-4	replace		X					Separate MAC
VENTILATOR KIT (AN/GRC-46A only)	replace		X					
WIRE AN/GRC-46A only)	replace	X						

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ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

(1) TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	(2) 1ST ECH	(3) 2ND ECH	(4) 3RD ECH	(5) 4TH ECH	(6) 5TH ECH	(7) TOOL CODE	(8) REMARKS
AN/GRC-16; AN/GRC-16A; AN/VRC-29 (continued)							
ACCESORY KIT MK-288/URM			†	†	†	1	
ANALYZER, SPECTRUM TS-723/U				†	†	2	
AUDIO OSCILLATOR TS-382/U				†	†	3	
ELECTRONIC MULTIMETER TS-505/U			†	†	†	4	
FREQUENCY METER AN/URM-32			†			5	
FREQUENCY METER AN/URM-79				†		6	
FREQUENCY METER AN/USM-26					†	7	
MULTIMETER AN/URM-105		†	†	†	†	8	
OSCILLOSCOPE OS-8/U				†	†	9	
POWER SUPPLY PP-1243/U			†			10	
R. F. SIGNAL GENERATOR AN/URM-25			†	†	†	11	
TEST SET, ELECTRON TUBE TV-2/U					†	12	
TEST SET, ELECTRON TUBE TV-7/U		†	†	†		13	
TOOL EQUIPMENT TE-50B		†				14	
TOOL EQUIPMENT TE-113			†	†	†	15	
VOLTMETER, METER ME-30/U				†	†	16	

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BY ORDER OF THE SECRETARY OF THE ARMY:

G. H. DECKER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army: To be distributed in accordance with DA Form 12-7 requirements for TM 11-series (uncias); plus the following formula:

USASA (2)
CNGB (1)
Tech Stf, DA (1) except CSigO (18)
DASA (5)
ARADCOM (2)
ARADCOM Rgn (2)
MDW (1)
Seventh US Army (2)
EUSA (2)
Units organized under following TOE's (2 copies each except as indicated):
1-7
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5-5
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6-500 (AA)
6-501
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9-217
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9-500 (AA-AC)
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11-165
11-166
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11-557
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11-597
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17-26
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17-66
17-77
17-85
17-86
17-115
17-116
29-56
33-105
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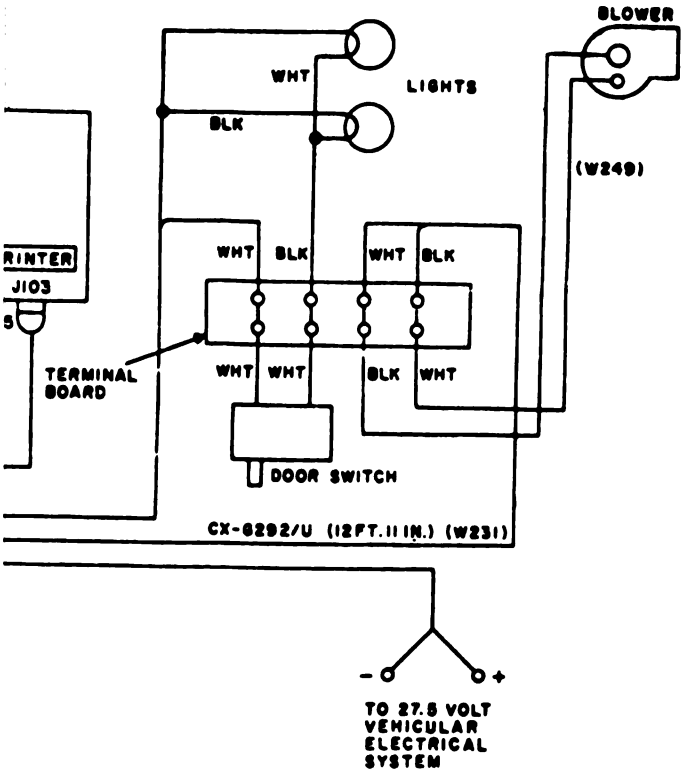
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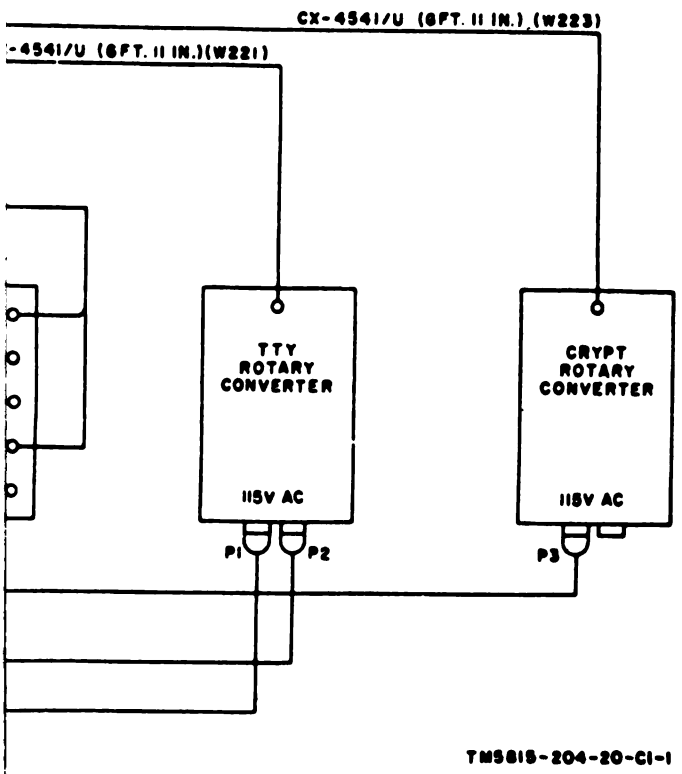
44-15	44-448	55-46
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44-437	44-548	55-500 (AA-AE)
44-445	55-11	57
44-446	55-12	57-5
44-447	55-16	

NG: State AG (3); Units—same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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TM5815-204-20-CI-1

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Organizational Maintenance Manual

RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AN/GRC-46B, AND AN/VRC-29

CHANGE
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *21 October 1963*

TM 11-5815-204-20, 11 September 1959, is changed as follows:

Note. The parenthetical reference to a previous change (example: "page 1 of C 5") indicates that pertinent material was published in that change.

Page 2, paragraph 1 (page 1 of C 5). Delete the note in paragraph 1.

Add paragraph 1.1 after paragraph 1.

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply manuals (type 4, 6, 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders which are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

Paragraph 2 (page 1 of C 2, and page 1 of C 5). Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA technical manual parts lists or supply manual 7, 8 or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil pen, or typewriter. The original and one copy will be forwarded direct to: Commanding Officer, U. S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, New Jersey 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor, etc.).

Page 9. Add paragraph 11.1 after paragraph 11.

11.1. Internal Connections
(fig. 4.1)

a. The T-195(*)/GRC-19 must be properly connected for fsk operation. When receiving a new or reconditioned T-195(*)/GRC-19, make the following check to insure proper connection:

(1) Set Multimeter AN/URM-105 at OHMS.

(2) Place the multimeter test leads on the center conductors of the FSK IN and MO OUT connectors, located on the front panel.

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(3) An indication of infinite resistance indicates proper connection for fsk operation.

b. If the ohmmeter indicates 0 ohm, proceed as follows:

(1) Loosen the 16 Allen-head screws that hold the front panel to the cabinet, and slide the transmitter out of its case.

(2) Remove plug P601 from jack J620 (A, fig. 4.1). Remove plug P601 from jack J101.

(3) Insert plug P601 in jack J101 (B, fig. 4.1). Insert plug P601 in jack J620.

(4) Push the transmitter back into its case, and tighten the 16 front panel Allen-head screws.

Add figure 4.1 after paragraph 11.1.

Page 31, appendix I (page 3 of C 2). Add the following references to appendix I:

DA Pam 310–4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Type 4, 6, 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TM 9–213	Painting Instructions for Field Use.
TM 38–750	The Army Equipment Record System and Procedures.

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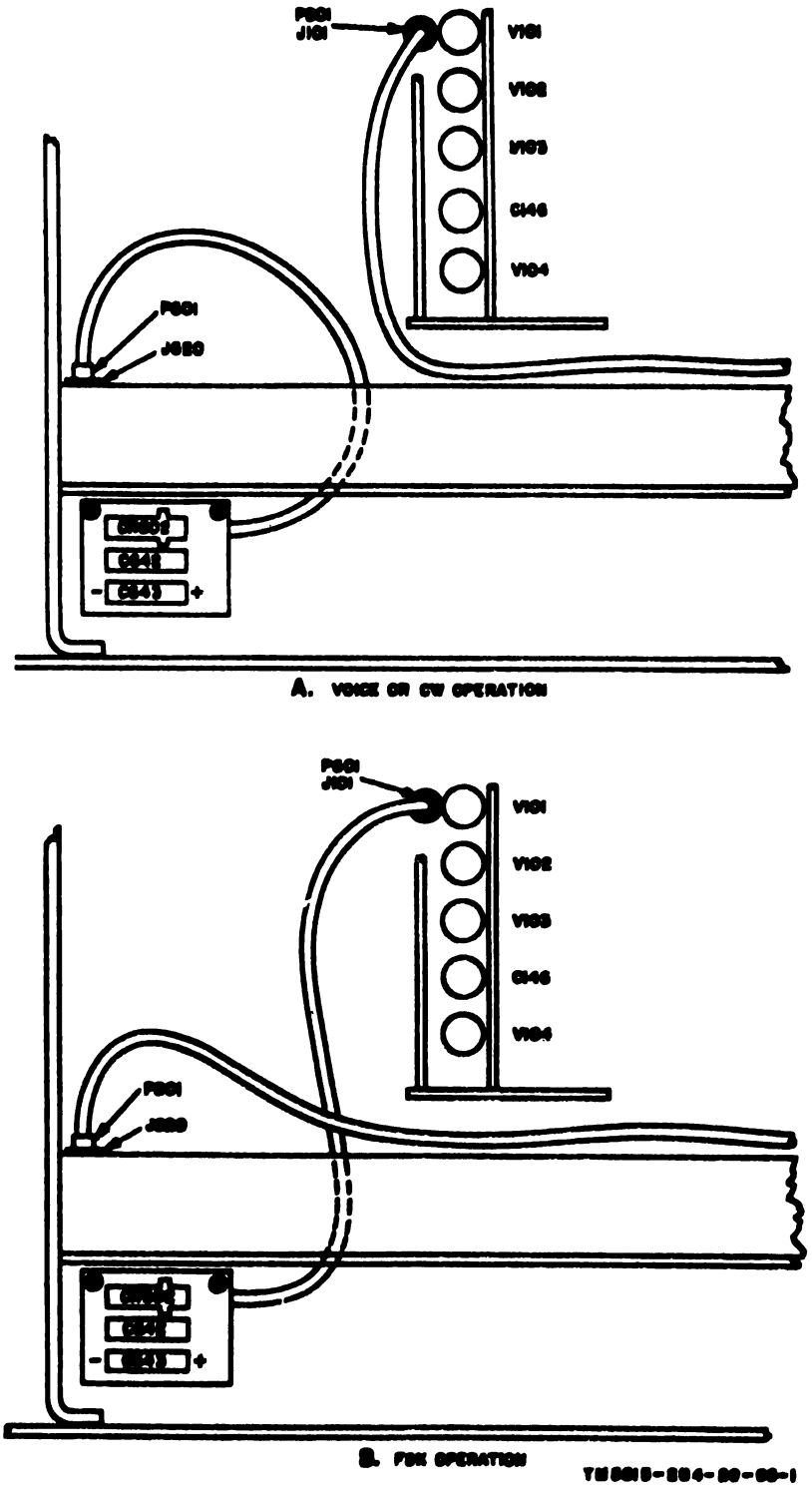


Figure 4-1. Transmitter, Radio T-195(*)/ GRC-19, internal connections for voice and cw and fsk operation.

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By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:
To be distributed in accordance with DA Form 12-32, Sec II (Unclas) requirements for Redstone and Honest John and Sergeant and Corporal and Lacrosse and Nike Hercules and Pershing and Nike Ajax and Hawk and Nike Hercules Improved and Target Missiles, TM, Radio.

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TM 11-5815-204-20
C 7

Change
No. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *8 October 1974*

Organizational Maintenance Manual
RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AN/GRC-46B, AN/GRC-46C, AND AN/VRC-29

TM 11-5815-204-20, 11 September 1959, is changed as follows:

This change indicates the manual is changed to apply to Radio Teletypewriter Set AN/GRC-46C also.

Change the title of the manual to read as shown above.

Page 2, paragraph 1.1. Delete paragraph 1.1 and substitute:

1.1. Indexes of Publications

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

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

Delete paragraph 2 and substitute:

2. Forms and Records

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

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58/NAVSUP PUB 378/AFR 71-4/MCO P4030.29, and DSAR 4145.8.

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

2.1. Reporting of Equipment Publication Improvements

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

Page 7, paragraph 8c, is superseded as follows:

c. Main Power Cable. Connect the vehicular and auxiliary power cables from source to the proper receptacle on the outside shelter wall.

Facing page 10. Add figure 5.2 after figure 5.1.

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By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Vice Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-51, Organizational maintenance requirements for AN/GRC-46 and AN/VRC-29.

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Changes in force: C 1, C 2, C 5, C 6, C 7, and C 8

TM 11-5815-204-20
C 8

CHANGE
No. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. *7 April 1975*

Organizational Maintenance Manual
RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AN/GRC-46B, AND AN/VRC-29

TM 11-5815-204-20, 1 September 1959, is changed as follows:

Inside front cover. Radiation warning is added after existing notices.

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WARNING
RADIATION HAZARD



RADIOACTIVE MATERIAL
CONTROLLED DISPOSAL REQUIRED
ACCOUNTABILITY NOT REQUIRED

STD RW—2

Voltmeter	Ra 226	0.28uCi	6625-00-580-1901
Ammeter	Ra 226	0.28uCi	6625-00-580-9579
Ammeter	Ra 226	0.59uCi	6625-00-569-0243
Meter	Ra 226	0.69uCi	6625-00-669-0769
	Electron Tube	OA2WA	5960-00-503-4880
EEVC	U 238	0.1uCi	
CBS Hytron	Ni 63	0.5uCi	
Raytheon	Co 60	0.2uCi	

Radiation Hazard Information: The following radiation hazard information must be read and understood by all personnel before operating or repairing Radio Teletypewriter Sets AN/GRC-46, AN/GRC-46A, AN/GRC-46B, and AN/VRC-29. Hazardous radioactive materials are present in the above listed components of Frequency Shift Converter CV-278/GR and Transmitter Radio T-195A, and B/GRC-19.

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.

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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.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-51, Organizational maintenance requirements for AN/GRC-46 and AN/VRC-29.

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TM 11-5815-204-20
C 9

CHANGE NO. 9

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *17 December 1976*

Organizational Maintenance Manual
RADIO TELETYPEWRITER SETS AN/GRC-46, AN/GRC-46A, AN/GRC-46B, AN/GRC-46C, AND AN/VRC-29

TM 11-5815-204-20, 11 September 1959, is changed as follows:

Page 2. Paragraph 2 is superseded as follows:

2. Reporting of Errors

The reporting of errors, omissions and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Forth Monmouth, NJ 07703.
Paragraph 2.1 is added after paragraph 2.

2.1 Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407 (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed directly to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

Figure 5.2. Make the following changes:
Delete "VEHICULAR SYSTEM" and substitute "AUXILIARY ELECTRICAL SYSTEM."
Delete "AUXILIARY ELECTRICAL SYSTEM" and substitute "VEHICULAR SYSTEM."

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

PAUL T. SMITH
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-51, organizational maintenance requirements for AN/GRC-46 and AN/GRC-29.

LVS—GPO221
907-895-2
ARMY

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Changes in force; C1, C2, C5 C6, C7, C8, and C9

TM 11-5815-204-20
C 10

CHANGE
NO. 10

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *2 June 1980*

Organizational Maintenance
RADIO TELETYPEWRITER SETS
AN/GRC-46 (NSN 5815-00-543-1760)
AN/GRC-46A (NSN 5815-00-543-1760)
AN/GRC-46B (NSN 5815-00-570-5488)
AN/GRC-46C (NSN 5815-00-082-4205)
AN/VRC-29 (NSN 5815-00-543-1758)

TM 11-5815-204-20, 11 September 1959, is changed as follows:

Title of manual is changed as shown above.

Inside front cover. Add excessive weight warnings after existing warnings as follows:

WARNING

Transmitter, Radio T-195(*)/GRC-19 weighs approximately 122 pounds. Two persons are required to lift it whenever it is moved. Be very careful when handling the tranmitter to prevent injury to personnel and damage to equipment.

WARNING

Receiver, Radio R-390(*)/URR weighs approximately 52 pounds. Two persons are required to lift it whenever it is moved. Be very careful when handling the receiver to prevent injury to personnel and damage to equipment.

By Order of the Secretary of the Army:

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

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-51, Operator Maintenance requirements for AN/GRC-46 and AN/VRC-29.

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TECHNICAL MANUAL
No. 11-5815-204-20

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *11 September 1959*

RADIO TELETYPEWRITER SETS AN/GRC-46 AND AN/VRC-29

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	Checking unpacked equipment	5	7
	Siting	6	7
	Tools and test equipment	7	7
	Installation of Radio Teletypewriter Set AN/GRC-46 in cargo truck M-37	8	7
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	Installation of Radio Teletypewriter Set AN/VRC-29	10	8
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	Tube testing techniques	20	26
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	Packaging Radio Teletypewriter Set AN/GRC-46	23	29
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CHAPTER 1
INTRODUCTION AND INSTALLATION

Section I. INTRODUCTION

1. Scope

This manual covers the installation and second echelon maintenance of Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29. The operating instructions for this equipment are contained in TM 11–5815–204–10, Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29, Operator's Manual.

Note. For applicable forms and records, see paragraph 2, TM 11–5815–204–10.

2. Comments

Forward comments concerning this manual to the Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, N. J.

Section II. INSTALLATION

3. General

a. Radio Teletypewriter Set AN/GRC–46 is a complete system with all operating components and cables installed. The installation instructions are limited to those necessary to place a completely assembled radio teletypewriter set into operation. Instructions are limited to the installation of the following:

(1) Whip antenna.

(2) Fuel tank.

(3) Ground strap.

(4) Ground rod.

b. Radio Teletypewriter Set AN/VRC–29 is shipped in crates and is installed in an armored vehicle at the depot.

4. Unpacking

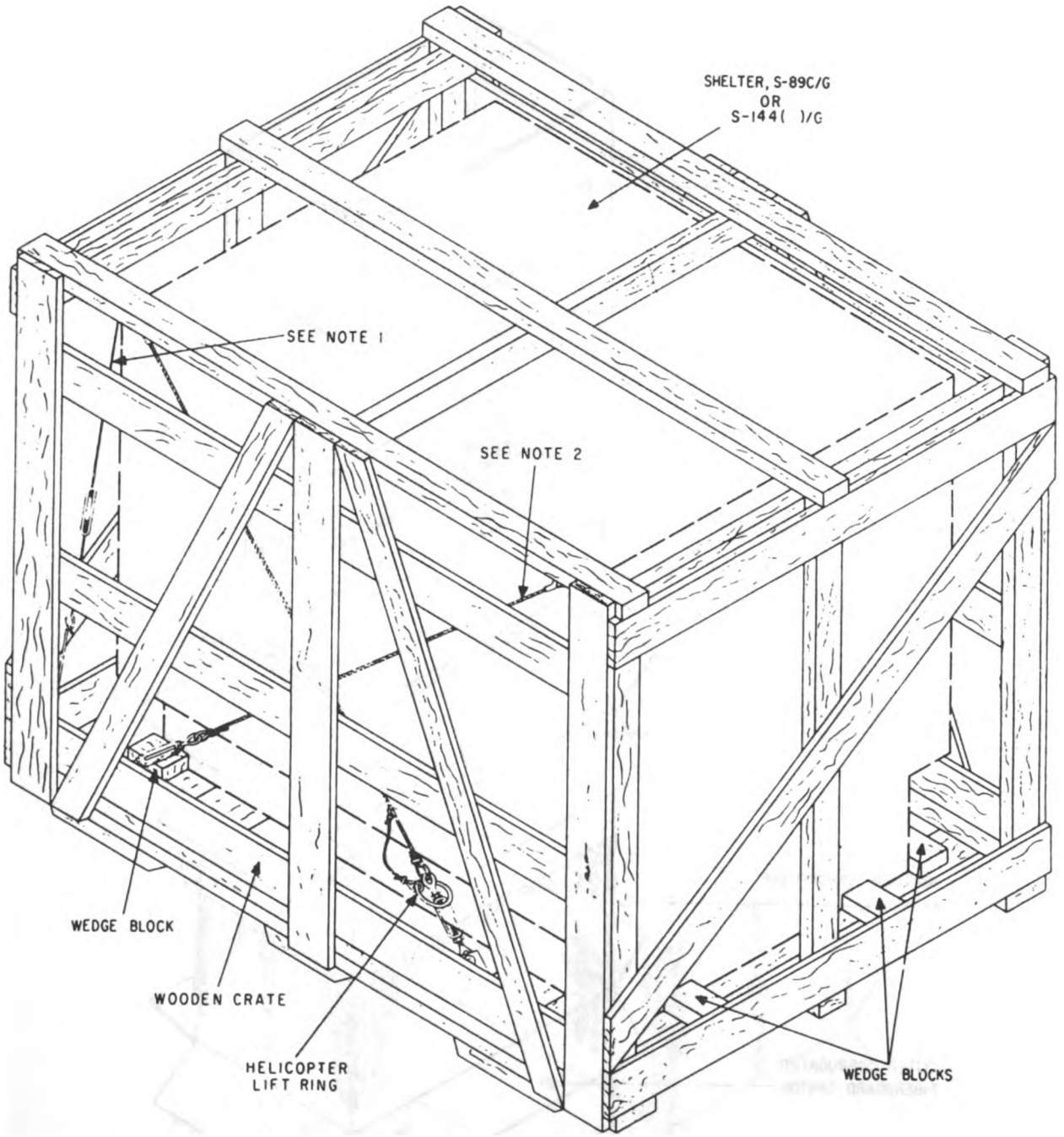
a. Radio Teletypewriter Set AN/GRC–46 is shipped as a complete system with all components installed in the shelter. The shelter is fastened to a skid and protected by a crate framework (fig. 1).

b. The components of Radio Teletypewriter Set AN/VRC–29 are packed in fiberboard cartons (figs. 2 and 3) which are packaged in a large wooden crate (fig. 4). The number, size, weight, and contents of each package are indicated in the following chart:

Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Weight (lb)	Contents
12½	10	15½	1.1	40	TTY rotary converter
12½	10	15½	1.1	40	Crypt rotary converter
5	10	13½	.4	15	Mounting MT–791/U (modulator)
5	10	13½	.4	15	Mounting MT–791/U (converter)
9½	10	20	1.1	23½	Radio Transmitter Modulator MD–203/GR
9½	10	20	1.1	19½	Frequency Shift Converter CV–278/GR
10	12	19	1.3	12¼	Interconnecting Box J–668/GR

c. Radio Set AN/GRC–19, Teletypewriter Set TT–98B/FG, and Teletypewriter Reperforator Transmitter TT–76(*)/GGC, used in the AN/VRC–29, are packaged separately. For packaging information on these equipments see the appropriate technical manual.

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NOTES

1. S-89C/Q SHIPPED WITH ONE ADJUSTABLE HOLD-DOWN BAR FOR EACH CORNER (3 NOT SHOWN)

2. S-144( )/Q SHIPPED WITH FOUR ADJUSTABLE WIRE ROPES (2 NOT SHOWN)

TM5815-204-20-1

Figure 1. Radio Teletypewriter Set AN/GRC-46 crated for shipment.

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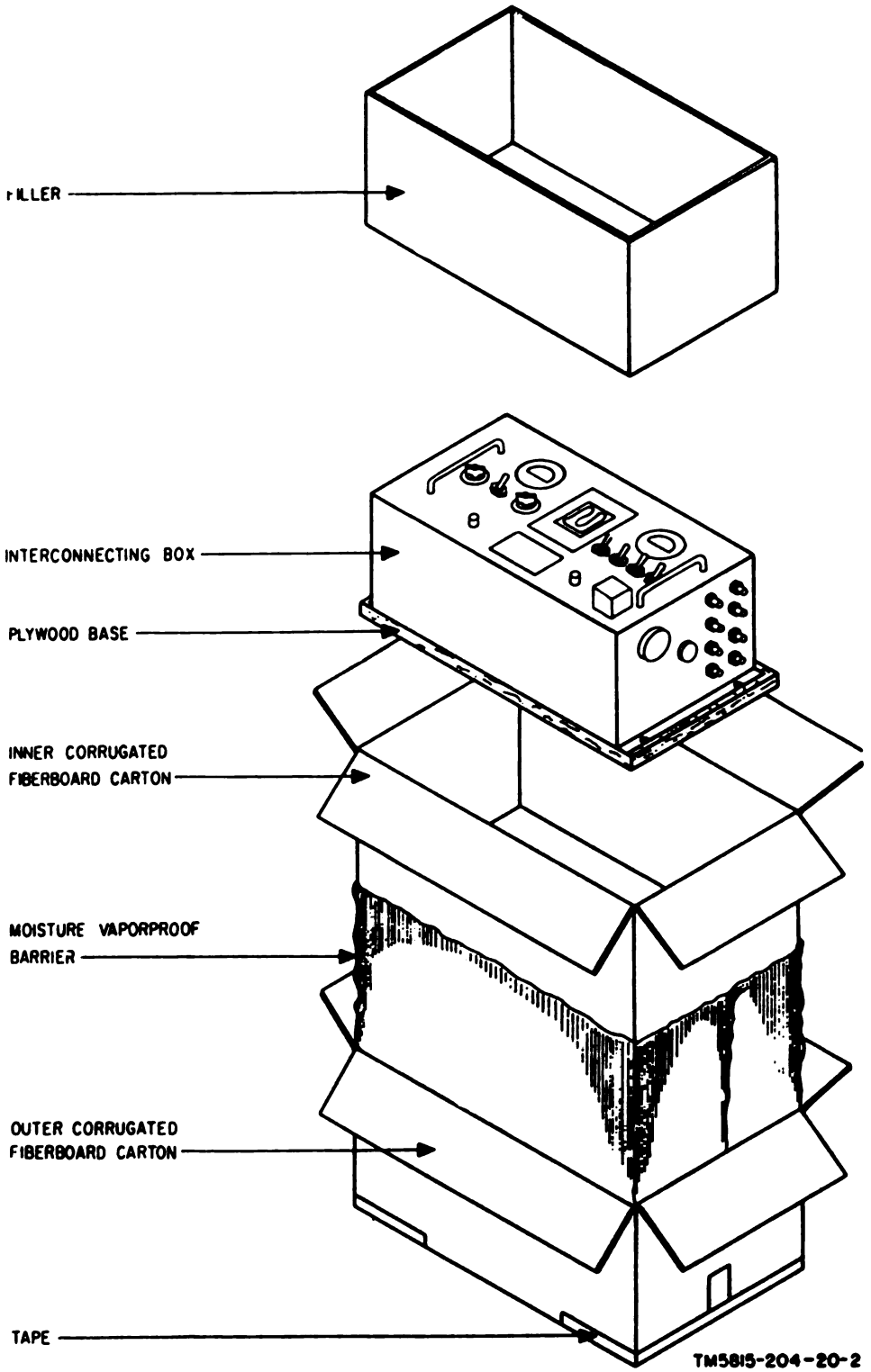


Figure 2. Packaging, interconnecting box.

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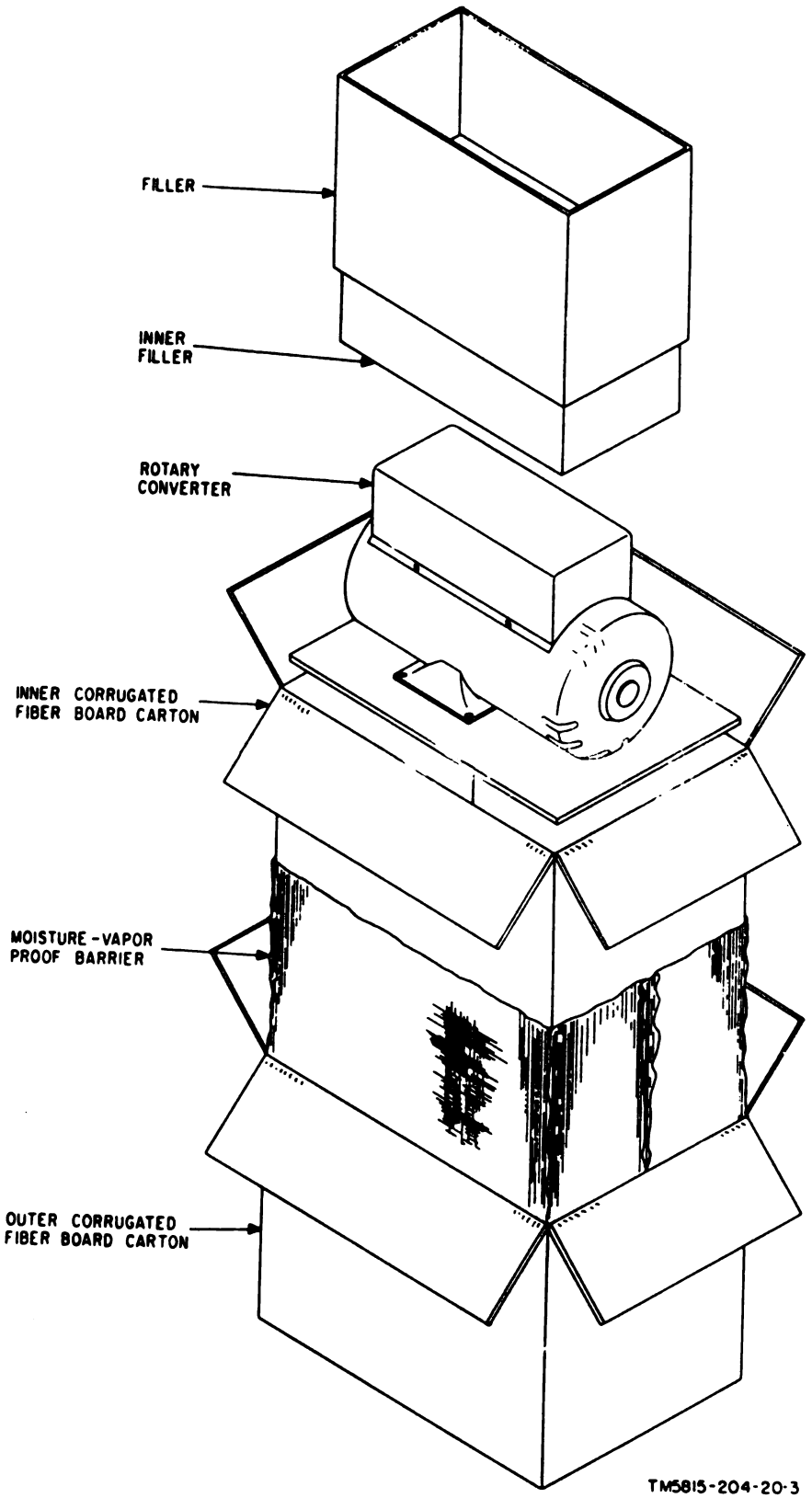


Figure 3. Packaging, rotary converter.

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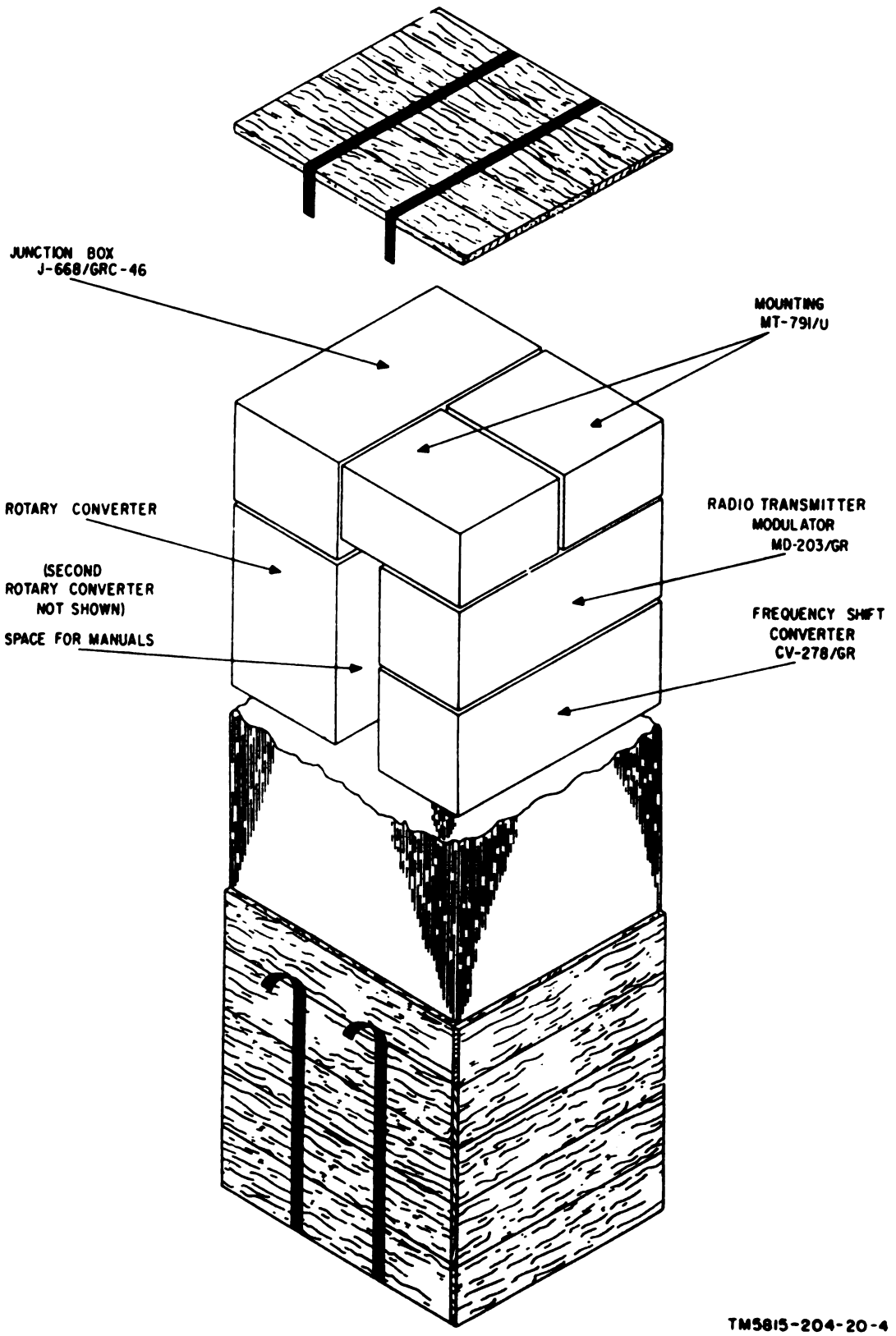


Figure 4. Packaging components, Radio Teletypewriter Set AN/VRC-29.

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5. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, refer to paragraph 2, TM 11–5815–204–10.

b. See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check it against the table of components in TM 11–5815–204–10.

c. If the equipment has been used or reconditioned, check for any change made by a modification work order (MWO). If modified, the MWO number will appear near the nomenclature plate.

6. Siting

Refer to the applicable manual for Radio Set AN/GRC–19 for siting data.

7. Tools and Test Equipment

No special tools or test equipment is required for installation of the AN/GRC–46 or AN/VRC–29.

8. Installation of Radio Teletypewriter Set AN/GRC–46 in Cargo Truck M–37

a. General. The components of Radio Teletypewriter Set AN/GRC–46 are installed in Shelter S–89C at the factory. When the shelter is installed on Cargo Truck M–37, the following modifications to the truck are necessary:

(1) The spare tire must be moved.

(2) The truck must have a 28-volt direct current (dc), 100-ampere generator system.

(3) The truck bows may have to be extended.

(4) The tail gate *must* remain in the horizontal position when the shelter heater is operating to allow the heater exhaust gases to escape.

Warning: **Operating the shelter heater with the tail gate up will cause dangerous gas to back up into the shelter.**

b. The various components of Radio Teletypewriter Set AN/GRC–46 are fastened into the shelter and do not require any special packaging. However, precautions have been taken to make certain there are no loose objects to rattle or jar loose. Before using, remove any cord and/or packing which has been used to hold the seats, accessories box, stakes, and other loose objects in place.

c. Main Power Cable. Pull the main power cable through the opening in the shelter wall, into the cab over the seat back, then down, and attach the wires to the truck storage battery.

9. Additional Installation Instructions

a. Antenna Installation. The installation of the antenna is described in TM 11–274, Radio Set AN/GRC–19.

b. Fuel Tank. Install the fuel tank as follows:

(1) Remove the end of the fuel line (figure 10, TM 11–5815–204–10) from the dummy fitting on the shelter.

(2) Loosen the three wing nuts that hold the fuel tank to the inside of the shelter door.

(3) Install the fuel tank on the outside of the shelter to the left of the door. Slide the back of the fuel tank up and under the outside bracket and then down into the groove in the mounting. Tighten the three wing nuts.

(4) Install the exhaust pipe elbow, exhaust pipe extension, and flexible exhaust pipe on the space heater.

Warning: **When operating the shelter heater, make certain that the truck tail gate is in a horizontal position. Operating the heater with the tail gate up will cause harmful fumes to back up into the shelter.**

(5) Install the fuel line on the fuel filter. To clear the line of air, temporarily disconnect the fuel line and allow some gas to flow into a container. Reconnect the fuel line.

c. Ground Strap. The ground strap provides an electrical bond between the shelter and the truck. One end of the ground strap connects to the ground terminal post on the outside of the shelter. The ground terminal post is located to the left of the shelter door. The other end of the ground strap is connected to a suitable ground on the frame of the truck. Make certain that the ground points are clean and free of dirt and grease.

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d. Ground Rod. When operating the radio teletypewriter set at a fixed site, it is advisable to use an earth ground. Select a point near the truck and drive the ground rod into the ground. Connect a ground strap between the ground rod and the frame of the truck.

10. Installation of Radio Teletypewriter Set AN/VRC–29

The components which make up an AN/VRC–29 are shipped to a depot in wooden crates (par. 4*b*, *c*), where they are installed in an armored vehicle. Armored Personnel Carrier M59 is a typical vehicle. Installation instructions are contained in the installation and hardware kits for the AN/VRC–29.

11. Cable Connections

Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29 may be operated with or without security equipment. The type of operation is accomplished by cable connections. Details on cabling, installation, and operation of the security equipment will be found in the manuals covering the specific security equipment used. The following chart indicates the cable lengths, nomenclature, and the equipment connections for simplex (one way reversible) operation. The cables are identified by the nomenclature number stamped on a metal band which is fastened around the cable.

Cable nomenclature	AN/GRC–46 cable length (in.)	AN/VRC–29 cable length (in.)	Connects	
			From	To
CX–4542/U	107	98	Junction box POWER INPUT (on top).	Vehicular electrical system
CX–4543/U	123	Not required	Junction box BLOWER receptacle (on top).	Blower
CX–4545/U	77	77	Junction box LIGHTS receptacle (on top).	Lights and door switch on AN/GRC–46. Lights on AN/VRC–29.
CX–4540/U	38	22	Junction box CV–278 receptacle (on top).	Frequency-shift converter 27.5 VOLTS DC receptacle.
CX–4540/U	54	22	Junction box MD–203 receptacle (on top).	Modulator 27.5 VOLTS DC receptacle.
CX–4540/U	152	Not required	Junction box HEATER receptacle (on top).	Heater
CX–4539/U	57	62	Junction box T–195 receptacle (on top).	Transmitter 24 VOLTS DC receptacle.
CX–4549/U	53	39	Junction box BATTERY receptacle (left side).	Teletypewriter RED plug to positive jack, BLACK plug to negative jack.
CG–409C/U	51	39	Junction box MD–203 receptacle (left side).	Modulator KEYING INPUT receptacle.
CX–4546/U	45	76	Junction box TRANS CONTROL receptacle (left side).	Receiver AUDIO receptacle
CX–4547/U	66	42	Junction box CV–278 receptacle (left side).	Frequency-shift converter PRINTER receptacle.
CX–4541/U	83	37	Junction box ROTARY CONVERTER POWER INPUT TTY receptacle (right side).	Teletypewriter rotary converter dc terminals.
CX–4541/U	83	37	Junction box ROTARY CONVERTER POWER INPUT CRYPT receptacle (right side).	CRYPT rotary converter dc terminals.
CX–4551/U	89	83	Junction box TTY SIGNAL LINE receptacle (looking directly at right side of junction box, use receptacle on the extreme left).	Teletypewriter (black lead to terminal 1, white lead to terminal 2).

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Cable nomenclature	AN/GRC-46 cable length (in.)	AN/VRC-29 cable length (in.)	Connects	
			From	To
CX-4551/U	111	76	Reperforator REC receptacle	Teletypewriter (black lead to terminal 3, white lead to terminal 4).
CG-530B/U	35	17	Transmitter MO OUT receptacle.	Modulator MO INPUT receptacle.
CG-530B/U	35	17	Modulator FSK OUTPUT receptacle.	Transmitter FSK INPUT receptacle.
CG-1127/U	30	19	Receiver IF OUT receptacle	Frequency-shift converter INPUT receptacle.
Part of Teletypewriter Reperforator Transmitter TT-76(*)/GGC.			Reperforator (red plug)	Junction box TTY SIGNAL LINE KW9 INPUT receptacle.
Part of Teletypewriter Reperforator Transmitter TT-76(*)/GGC.			Reperforator (gray plug)	Junction box TTY SIGNAL LINE receptacle adjacent to the KW9 input receptacle.
Part of Teletypewriter TT-98B/FG.			Teletypewriter	Teletypewriter rotary converter AC receptacle.
Part of Teletypewriter Reperforator Transmitter TT-76(*)/GGC.			Reperforator	Teletypewriter rotary converter AC receptacle.
CG-1127/U Part of Radio Set AN/GRC-19.	10	10	Transmitter RECEIVER ANTENNA receptacle.	Receiver ANT receptacle
CX-1599/U Part of Radio Set AN/GRC-19.	9	9	Transmitter RECEIVER CONT receptacle.	Receiver POWER INPUT receptacle.
CX-1573/U or CX-1852/U Part of Radio Set AN/GRC-19.	72	72	Transmitter AUDIO receptacle	Microphone or telegraph key
CX-1334/U Part of Radio Set AN/GRC-19.	39	39	Receiver AUDIO receptacle	Headset or loudspeaker

12. Initial Adjustment of Equipment

Detailed initial adjustment instructions for each of the units of the radio teletypewriter set are covered in individual technical manuals. A list of these manuals is given in appendix I. Preliminary operating and starting procedures for Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29 are covered in TM 11–5815–204–10.

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CHAPTER 2
MAINTENANCE INSTRUCTIONS

Section I. GENERAL

13. Scope

The second echelon maintenance of Radio Teletypewriter Sets AN/GRC–46 and AN/GRC–29 consists of the following:

(1) Preventive maintenance (par. 15).

(2) Lubrication (par. 16).

(3) Visual inspection (par. 17).

(4) Equipment performance checklist (par. 18).

14. Tools, Materials, and Test Equipment Required

A list of parts normally stocked for unit repairman maintenance is contained in appendix III. The tools, materials, and test equipment required for unit repairman maintenance are listed below.

a. Tools. Tool Equipment TE–41.

b. Materials.

(1) Cleaning Compound (Federal stock No. 7930–395–9542).

(2) Cleaning cloth.

(3) Special Preservative Lubricating Oil (PL Special).

(4) Grease Aircraft and Instrument (GL).

(5) Fine sandpaper.

(6) Graphite, U. S. Army Specification 2–64A (Amend 1).

c. Test Equipment.

(1) Electron Tube Test Set TV–7/U.

(2) Multimeter TS–352/U.

15. Preventive Maintenance

a. DA Form 11–238. DA Form 11–238 (figs. 7 and 8) is a preventive maintenance checklist to be used by the unit repairman. Items not applicable to the equipment are lined out in the figures. References in the ITEM block in the figures are to paragraphs that contain additional maintenance information pertinent to the particular item. Additional preventive maintenance information concerning items *2*, *3*, *6*, and *7* on DA Form 11–238 will be found in the preventive maintenance portion of TM 11–5815–204–10. Instructions for the use of the form appear on the form.

b. Items. The information shown below is supplementary to DA Form 11–238. The item numbers corespond to the ITEM numbers on the form.

Warning: **Obtain permission to disconnect all power before performing the following operations. When power to the equipment is disconnected, some capacitors still may retain voltage of dangerous potential. Before touching exposed electrical parts, short-circuit the part to ground. When maintenance is completed, replace the equipment in its case, reconnect the power, and check for satisfactory operation.**

Item	Maintenance procedures
5	Use a clean cloth to remove dust, dirt, moisture, and grease from the antenna mount, microphone headset, and front panel controls. If necessary, wet the cloth with Cleaning Compound and then wipe the parts dry with a clean cloth. Use a soft-bristled brush to clean the teletypewriter mechanism.
6	Remove all rust from components and touch up bare spots with paint.

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ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26 INSPECT ANTENNA [redacted] CORROSION LOOSE FIT DAMAGED INSULATORS [redacted]	✓
27 CHECK FOR NORMAL OPERATION	✓
28 [redacted]	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION INDICATE ACTION TAKEN FOR CORRECTION

ITEM 10. CONNECTOR THREAD DAMAGED ON CABLE CX-4540/U. REPORTED TO 3D ECHELON FOR REPLACEMENT.

MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
SOUND EQUIPMENT, RADIO, DIRECTION FINDING
RADAR, CARRIER, RADIOSONDE AND TELEVISION
(AR 750-625)

EQUIPMENT NOMENCLATURE: RADIO TELETYPEWRITER SET AN/GRC-46

EQUIPMENT SERIAL NUMBER: 100

FOLD

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue

1 For detailed Preventive Maintenance instructions see:
- a The Technical Manual *(in TM 11 series)* for the equipment *(See DA Pamphlet Number 310-4)*
- b The Supply Bulletin *(SB 11-100 series)* for the equipment *(See DA Pamphlet Number 310-4)*
- c The Department of the Army Lubrication Order *(See DA Pamphlet Number 310-4)*

2 The following action will be taken by either the Communications Officer Chief for 1st echelon, or the Inspector for higher echelon:
- a Enter Equipment Nomenclature and Serial Number.
- b Strike out items that do not apply to the equipment

3 Operator Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND

4 After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor

TYPE OF INSPECTION

OPERATOR	2/3 ECHELON	DATE	SIGNATURE
	✓	29 MAY 1959	Arnold C. Fifit

DA FORM 1 MAY 57 11-238

REPLACES DA FORMS 11-238, 1 NOV 56, 11-239, 11-244, 11-245, 11-246, 11-248, 11-250 AND 11-251, WHICH ARE OBSOLETE

TM5815-204-20-9

Figure 7. DA Form 11-238, pages 1 and 4.

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LEGEND for marking conditions:
Satisfactory, ✓.
Adjustment, Repair or Replacement required, X.
Defect corrected, (X).

DAILY CONDITION FOR MONTH OF MAY 1959

NO.	DAILY ITEM	1/17	2/18	3/19	4/20	5/21	6/22	7/23	8/24	9/25	10/26	11/27	12/28	13/29	14/30	15/31	16	2D 3D ECHELON
1.	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT (Transmitter, receiver, [illegible], wire, cables, microphones, tubes, spare parts, technical manuals).																	✓
2.	CLEAN DIRT AND MOISTURE FROM ANTENNA, MICROPHONES, HEADSETS, KEYS, JACKS, PLUGS, COMPONENT PANELS.																	✓
3.	INSPECT CONTROLS FOR NORMAL OPERATION. TAP CONTROLS LIGHTLY FOR EVIDENCE OF CUT-OUT FROM LOOSE CONTACTS.																	✓
4.	CHECK FOR NORMAL OPERATION OF EQUIPMENT. BE ALERT FOR UNUSUAL OPERATION OR CONDITION.																	✓

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS, TRANSMISSION LINES. PAR 15b(5)						
6. INSPECT CASES, MOUNTS, ANTENNA [illegible] AND EXPOSED METAL SURFACES FOR RUST, CORROSION. PAR 15b(6)						
7. INSPECT CORDS, CABLE, WIRE, SHOCK MOUNTS FOR CUTS, KINKS, BREAKS, FRAYING, UNDUE STRAIN. PAR 15b(7)						
8. [illegible]						
9. [illegible]						
10. INSPECT ACCESSIBLE ITEMS FOR LOOSENESS: SWITCHES, KNOBS, JACKS, CONNECTORS, RELAYS, TRANSFORMERS, MOTORS, PILOT LIGHTS, BLOWERS, ETC.						X
11. CLEAN AND/OR INSPECT AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS						✓
12. [illegible]						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13. [illegible]	
14. [illegible]	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. INSPECT SEATING OF READILY ACCESSIBLE PLUCK-OUT ITEMS: TUBES, LAMPS, FUSES, CRYSTALS, CONNECTORS, VIBRATORS, [illegible]	✓
16. INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTINGS, BAD CONTACTS, MIS-ALINEMENT OF CONTACTS AND SPRINGS, PROPER SPRING TENSION.	✓
17. INSPECT VARIABLE CAPACITORS FOR DIRT, MIS-ALINEMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE.	✓
18. INSPECT RESISTORS, [illegible] AND INSULATORS FOR CRACKS, CHIPPING, BLISTERING, MOISTURE, DISCOLORATION.	✓
19. CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, BLOWERS, RELAY CASES AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE. PAR 15b (19)	(X)
20. INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	✓
21. INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS.	✓
22. INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR OVERHEATING AND OIL LEAKAGE.	✓
23. INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND PITTING OF COMMUTATOR.	✓
24. [illegible]	
25. INSPECT WATERPROOF GASKETS FOR LEAKS, WORN OR LOOSE PARTS.	✓

CONTINUED ON PAGE 4

2 3

TM 9815-204-20-10

Figure 8. DA Form 11-238, pages 2 and 3.

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Item	Maintenance procedures
7	Cover any cuts in the insulation with rubber tape and then with friction tape. Replace or repair all broken cords and cables.
10	All control knobs should work smoothly, and be tight on the shaft. Tighten all loose knobs; make sure that they do not rub against the panel.
19	Check to see that the blackout switch on door frames operates properly. Check ventilation fan blower; make sure that it is clean and tightly fastened.

Warning: **Cleaning Compound is flammable and its fumes are toxic. Do not use near a flame. Provide adequate ventilation.**

16. Lubrication

a. Lubrication of Shelter. Under ordinary conditions of temperature and humidity, lubricate the following points at monthly intervals. In excessively hot, humid, or dusty areas, more frequent lubrication may be required.

(1) *Locks and latches.* Lubricate the door and window locks and latches sparingly with graphite.

(2) *Hinges.* Lubricate the hinges of the vent flaps, spare parts box, heater grill, and the slides of the doors and windows sparingly with light machine oil. Oil (PL Special) is suitable.

(3) *Blackout covers.* Lubricate the slides of the blackout covers with a light grease.

b. Lubrication of Rotary Converters. The rotary converter and the heater motor are equipped with ball bearings which are sealed and lubricated during manufacture. In normal use, no lubrication is necessary for the life of the converter. The sealed bearings cannot be relubricated; they must be replaced if they become noisy or rough.

c. Additional Lubrication Instructions. The components and their associated technical manuals, which cover the lubrication instructions for the components, are listed below.

Component	Technical manual
Radio Set AN/GRC-19	TM 11-274
Frequency Shift Converter CU-278/GR	TM 11-5820-205-20
Radio Transmitter Modulator MD-203/GR	TM 11-5805-210-20
Teletypewriter Reperforator-Transmitter TT-76 (*)/GGC	TM 11-2225
Teletypewriter TT-98B/FG	TM 11-2230

Section II. TROUBLESHOOTING

17. Visual Inspection

Before operating the equipment, inspect it. This will save repair time and also avoid further damage to the equipment. Inspect the following for obvious defects:

a. Proper settings of switches and controls.

b. Proper cables and cords making good contact in the correct jack or connectors.

c. Fuses. (A burned-out fuse usually indicates some other defect.)

d. Bad ground connections.

e. Low voltage.

f. Defective tubes.

18. Equipment Performance Checklist

a. General. The equipment performance checklist is a procedure for systematically checking equipment performance. All corrective measures which the unit repairman can perform are given in the *Corrective measures* column. When using the checklist, start at the

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beginning and follow each step in order. If the corrective measures indicated do not fix the equipment, troubleshooting is required by higher echelon. Note on the repair tag how the equipment performed and what corrective measures were taken.

b. Procedure. Place the set in operation as shown in the checklist in *c* below.

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c. Equipment Performance Checklist.

	Step No.	Unit	Action or condition	Normal indication	Corrective measures
PREPARATORY		*Interconnecting Box J–668/GR*			
	1	MAIN POWER circuit breakers	Set to OFF.		
	2	LIGHTS switch	Set to OFF.		
	3	BLOWER switch	Set to OFF.		
	4	TTY switch	Set to OFF.		
	5	CRYPT switch	Set to OFF.		
	6	Cables	Refer to paragraph 11, cable connections. Check to see that all cables are connected and that they are connected to the proper points.		
		Radio Transmitter T–195/GRC–19			
	7	SERVICE SELECTOR control	Turn to OFF.		
	8	Antenna	Connect doublet to 50 OHMS OUTPUT or whip to WHIP. ANTENNA receptacle.		
	9	Ground wire	Connect between GROUND binding post and a good ground if transmitter is not installed on Mounting MT–851/GRC–19 or MT–925/GRC–19 in vehicle.		
	10	Telegraph key or microphone	Connect to AUDIO receptacle.		
	11	RECEIVER ANTENNA receptacle	Connects through Cable CG–1127/U to the ANT receptacle on the receiver.		
	12	RELAY-NORMAL-DUPLEX control.	Turn to NORMAL.		
	13	BAND SELECTOR control	Tighten locking control.		
	14	TUNING CONTROL	Tighten locking bar.		
	15	TEST METER switch	Turn to BATT.		
	16	DIAL DIM switch	Turn to FULL.		
	17	Blower port covers	Each cover in open position.		
		Radio Receiver R–392/URR			
	18	Function switch	Set to OFF.		
	19	Speaker cable	Connected between either of the two AUDIO receptacles and the speaker.		

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	Step No.	Unit	Action or condition	Normal indication	Corrective measures
PREPARATORY	20	Electrical Special Purpose Cable Assembly CX-1599/U.	Connected between POWER INPUT receptacle on the receiver and the RECEIVER CONT receptacle on the transmitter.		
	21	BAND WIDTH switch	Set to 2KC.		
	22	RF GAIN SQUELCH THRESH control.	Set to full-clockwise position.		
	23	AF GAIN control	Set to midposition.		
	24	AGC switch	Set to CAL.		
	25	BFO switch	Set to ON.		
	26	DIAL DIM switch	Set to ON.		
		Radio Transmitter Modulator MD-203/GR.			
	27	POWER switch	Set to OFF.		
	28	MO INPUT cable (W205)	Connect between the MO INPUT receptacle on the modulator and the MO OUT receptacle on the transmitter.		
	29	FSK output cable (W203)	Connect between the FSK OUTPUT receptacle on the modulator and the FSK IN receptacle on the transmitter.		
	30	MCS BAND SELECTOR switch	Set to 1.5–1.7.		
		Frequency Shift Converter CV-278/GR.			
	31	POWER switch	Set to OFF.		
	32	If input cable (W211)	Connect between the INPUT receptacle on the frequency-shift converter and the IF OUT receptacle on the receiver.		
	33	SERVICE switch	Set to NOR.		
		Teletypewriter TT-98B/FG			
	34	MOTOR switch	Set to OFF.		
	35	LIGHT switch	Set to OFF.		
	36	Ground	Check connections at teletypewriter terminals.		
	37	Ac power cable	Connected to the AC receptacle on the rotary converter.		
	38	Typing unit	Paper and ribbon properly installed	Visible	Consult the teletypewriter manual.

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	Step No.	Unit	Action or condition	Normal indication	Corrective measures
PREPARATORY		*Teletypewriter Reperforator Transmitter TT-76(*)/GGC.*			
	39	Teletypewriter receive cable (W237).	Connected between the REC connector on the reperforator and terminals 3 and 4 of the teletypewriter. (The black lead must be connected to terminal 3 and the white lead to terminal 4 on the teletypewriter.)		
	40	POWER switch	Set to OFF.		
	41	MOTOR switch	Set to OFF.		
	42	LIGHT switch	Set to OFF.		
	43	Ground	Check connections. Be sure all power connections are in OFF position while checking.		
	44	Power cord	Power cord plugged in to the AC receptacle on the rotary converter.		
	45	Internal ac POWER switch	In ON position.		
	46	Paper tape	Check for adequate supply; be sure that paper tape is positioned correctly through its guides, under type wheel, and through pun and die assembly.		
	47	Inking ribbon	In proper position around spools and rollers, and passed through guide slots.		
EQUIPMENT PERFORMANCE		*Interconnecting Box J-668/GR*			
	48	BIAS 30 MA-LINE 60 MA switch	Set for BIAS reading.		
	49	LIGHTS switch	Set to ON	Lights light	Check lamps.
	50	BLOWER switch	Set to ON	Blower starts	Check fuse F1.
	51	MAIN POWER circuit breakers	Set to ON	DC VOLTS meter indicates 27.5 volts.	
		Radio Transmitter T-195/GRC-19			
	52	SERVICE SELECTOR switch	Turn to STANDBY	Test meter indicates normal (midpoint BATTERY scale).	If there is no meter indication, check FUSE 15 AMP 24 VOLT and/or power cable and connections.

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	Step No.	Unit	Action or condition	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE					If fuse continues to blow, refer to the transmitter manual.
					If meter indication is abnormal, use an external voltmeter to check the power source. 28 volts dc is required for proper operation.
					If above corrective measures do not remedy the trouble, refer to the transmitter manual (App II).
				Air intake and exhaust blowers operate (feel for movement of air).	Refer to the transmitter manual.
				Low-voltage dynamotor starts within 40 seconds (can be heard).	
		Radio Receiver R-392/URR			
	53	Function switch	Turn to NORMAL	Dial lamps light	Check power cable.
					Check vehicular battery.
					Check fuses and dial lamps. The 10 screws securing the frequency indicator dial window (on the front panel) must be removed to replace or check dial lamps.
				Rushing sound heard in headphones or over speaker.	Check tubes and connectors between subchassis.
		Radio Transmitter Modulator MD-203/GR.			
	54	POWER switch	Set to ON	Power indicator lamp lights	If indicator lamp does not light, check fuse and lamps. Check connection to junction box.
		Frequency Shift Converter CV-278/GR.			
	55	POWER switch	Set to ON	Power indicator lamp lights	If indicator lamp does not light, check fuse and lamp. Check connection to junction box.

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	Radio Receiver R-392/URR			
56	MEGACYCLES and KILOCYCLES controls.	Set MEGACYCLES control at any desired band. Tune through band by rotating KILOCYCLES control.	Signals are heard in headphones or loud speaker.	If signals are weak, adjust ANT TRIM control for stronger signal. If no signals are heard, check connections at ANT connector. Check tubes in receiver.
57	RF GAIN SQUELCH THRESH control. (AGC switch at ON.).	Tune in a station; then rotate the control in one direction and then the other.	Strength of signal increases and decreases.	Refer to receiver manual.
58	AF GAIN control	Rotate control in one direction and then in the other.	Strength of signal increases and decreases.	Refer to receiver manual.
59	Function switch	Turn to LIMITER	Noise peaks are reduced in amplitude.	Check V603. Refer to receiver manual.
		Turn to SQ. TUNE in several stations in turn.	No noise heard between stations	Check V602, V605, and V609. Refer to receiver manual.
60	AGC switch (FUNCTION switch at NORMAL).	With AGC switch set to ON, tune to a station giving a strong indication on the CARRIER LEVEL meter. Turn AGC switch to OFF.	Indication on CARRIER LEVEL meter decreases to a zero reading when switch is turned to OFF.	Check V601, V602, and V609. Refer to the receiver manual.
		Turn switch to CAL and vary KILOCYCLES control over its complete range.	Calibration signal heard every 100KC throughout the band.	Check V701, V702, and V703. Refer to receiver manual.
61	BFO PITCH control	Tune in a cw carrier with KILOCYCLES control. Rotate BFO PITCH control to either side of zero.	Change in pitch of audio tone	Refer to the receiver manual.
62	BAND WIDTH switch	Turn BFO switch to OFF. Tune receiver to a modulated signal; then place BAND WIDTH switch in each position, 8KC, 4KC, and 2KC.	Selectivity becomes sharper and noise decreases as bandwidth decreases. Only low-frequency audio is heard when switch is at 2KC position.	Refer to receiver manual.
	Frequency Shift Converter CV-278/GR.			
63	SIGNAL INPUT meter	Tune receiver to a teletypewriter signal.	As signal is properly tuned in, SIGNAL INPUT meter indicates maximum.	Check cabling. Refer to frequency-shift converter manual.
64	DISCRIMINATOR meter	As the teletypewriter signal in step 63 above, is tuned for maximum on the SIGNAL INPUT meter, observe the DISCRIMINATOR meter.	DISCRIMINATOR meter pointer should oscillate about the zero point.	Refer to frequency-shift converter manual.
	Before checking the remainder of the equipment, the receiver must be calibrated as follows:			

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EQUIPMENT PERFORMANCE

Step No.	Unit	Action or condition	Normal indication	Corrective measures
65	BFO switch	At ON.		
66	AGC switch	Set to CAL.		
67	RF GAIN	Set full clockwise.		
68	AUDIO GAIN	Set halfway.		
69	BFO PITCH	Set to zero.		
70	MEGACYCLES control	Set to assigned band	Desired band appears in window.	Refer to receiver manual.
71	BAND WIDTH switch	Set to 2KC.		
72	KILOCYCLES control	Set to 100KC point nearest the assigned frequency. Adjust control so that scale markings are alined.	The zero beat may or may not occur when the scale markings are aligned. If they are off a space or less refer to steps 72 and 74 to correct the error.	Refer to receiver manual.
73	DIAL ZERO	Lock.		
74	KILOCYCLES control	Turn very slightly so that zero beat and dial scale coincide.	With the DIAL ZERO locked, do not turn KILOCYCLES control too far; a slight adjustment should be adequate.	Refer to receiver manual.
75	DIAL ZERO	Unlock.		
76	BAND WIDTH switch	Set to 4KC or 8KC.		
77	KILOCYCLES control	Set to assigned frequency.		
78	AGC switch	Set to AGC.		
79	Function switch	Set to NET.		
	Radio Transmitter Modulator MD-203/GR.			
80	MCS BAND SELECTOR switch	This switch must be set at the same frequency band that the receiver and transmitter are calibrated for.		
	Radio Transmitter T-195/GRC-19			
81	PRESET CHANNELS switch ***Caution:*** **To prevent damage to the equipment, the BAND SELECTOR locking bar and the TUNING CONTROL locking bar must be in *lock* position before PRESET CHANNELS switch is used.**	Set to position 1 through 7, in turn	For each position of the PRESET CHANNELS switch, the autotune circuit will automatically tune the transmitter to the proper frequency indicated in the chart on the front panel.	Refer to transmitter manual.
82	PRESET CHANNELS switch	Set to M (manual) position.		
83	BAND SELECTOR control	Loosen locking bar and turn to band available for test purposes.		
84	TUNING CONTROL	Loosen locking bar and turn to frequency available for test purposes. Frequency must be within the band limits appearing in the band indicator window.		

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85	SERVICE SELECTOR switch	Turn to VOICE/FSK position.		
86	TEST METER switch	Turn to PA GRID.		
87	TEST KEY	Hold in ON position	High-voltage dynamotor starts within 10 seconds or less (can be heard). After completion of tuning cycle, red TUNING INDICATOR lights; grid current should be indicated within the shaded area marked PA GRID on the test meter.	Radio Transmitter Modulator MD-203/GR must be turned ON. The MCS BAND SELECTOR switch must be set to the same frequency range as the transmitter. Refer to modulator manual. If modulator is found to be operating properly, refer to transmitter manual.
		Release TEST KEY	High-voltage dynamotor stops. Test meter indicates zero.	
88	TEST METER switch	Turn to PA CATHODE.		
89	TEST KEY	Hold in ON position	Same as step 87 except test meter indicates PA cathode current within the shaded area.	Refer to transmitter manual.
		Release TEST KEY	Same as step 87.	Refer to transmitter manual.
90	Hand microphone	Press button on microphone and speak in a normal voice into microphone (hold about 2 inches from lips).	Cathode current should be indicated within shaded area marked PA CATHODE on test meter. The indication should fluctuate slightly while speaking. Voice peaks produce 88% or —2VU indication on audio level meter.	Check microphone and cord.
91	BAND SELECTOR control	Tighten locking bar.		
92	TUNING CONTROL	Tighten locking bar.		
93	RELAY - NORMAL - DUPLEX switch.	Set to DUPLEX.		
94	SERVICE SELECTOR switch	Set to CALIBRATE.		
95	PRESET CHANNELS switch	Set to position 1	The autotune mechanism will set the transmitter to the frequency for which position 1 was previously adjusted.	Refer to the transmitter manual.
96	BAND SELECTOR control	Loosen locking bar. Adjust BAND SELECTOR so that the assigned band appears in the window. *Note.* For purpose of this check list, the assigned frequency should be the same as that used to calibrate receiver. Step 65 through 79. Tighten locking bar.		
97	TUNING CONTROL	Loosen locking bar. Adjust so that assigned frequency appears in window. Adjust for zero beat as heard on receiver speaker.	As the TUNING CONTROL is adjusted to the assigned frequency, zero beat is heard. When exact zero beat is ob-	Refer to transmitter manual.

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	Step No.	Unit	Action or condition	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE			*Note.* The assigned frequency for this checklist is the same as the frequency to which the receiver is calibrated in Step 65 through 79.	tained the receiver and transmitter are both calibrated to the same frequency.	
	98	RELAY - NORMAL - DUPLEX switch.	Place in NORMAL position.		
		Interconnecting Box J-668/GR			
	99	TTY switch	Set to ON	TTY rotary converter starts	Check cables and check fuse.
		Teletypewriter Reperforator Transmitter TT-76(*)/GGC.			
	100	SELECTOR switch	Place in position 3. LOCAL PUNCH.		
	101	Reperforator keyboard	Punch an RY test tape. Refer to reperforator manual for detailed instructions for punching test tape.	As the reperforator keyboard is struck, punched tape feeds out of machine at the left.	Refer to the reperforator manual.
	102	SELECTOR switch	Place in position 2. TD SEND LOCAL PUNCH.		
	103	Transmitter distributor	Insert the test tape in the transmitter distributor.	Make sure tape is inserted properly. Tape is polarized to fit in transmitter distributor one way only.	Refer to reperforator manual.
	104	SEND-REC-MARK HOLD switch on shelf between teletypewriters.	Place in the SEND position.		
	105	Transmitter distributor START-STOP-FEED RETRACT switch.	Place in the START position	Tape is fed through the transmitter distributor.	Refer to reperforator manual.
	106	Transmitter TUNING CONTROL	Tune for a maximum indication on Frequency Shift Converter CV-278/GR SIGNAL INPUT meter and for a fluctuation about zero on the DISCRIMINATOR meter. This places the transmitter on the same frequency as the receiver. Tighten locking bar.	As the transmitter is tuned to the receiver frequency, a maximum indication is observed on the SIGNAL INPUT meter, and the DISCRIMINATOR meter fluctuates about zero.	Check to see that the frequency-shift converter is turned on. Check to see that the modulator is turned on.
	107	SERVICE SELECTOR switch	Place in VOICE/FSK.		
	108	Receiver function switch	Place in NORMAL position.		
	109	BFO switch	Place in the OFF position.		
		Teletypewriter TT-98B/FG			
	110	Typing unit and keyboard	With all switches set to ON equipment lined up, type at least 5 consecutive copies of a test message.	Teletypewriter runs closed (quiet) on steady marking current when not sending or receiving. Receives good copy when distant	Check and clean transmitter and contacts, line cords, and plugs. Consult teletypewriter manual.

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			station sends; receives good copy from local machine sending if operation is half duplex.	
111	Space bar	Pressed down momentarily	Inserts single space as between words.	Refer to teletypewriter manual.
112	REPEAT key	Press the REPEAT key and any letter of the alphabet.	Continues to send the letter transmitted as long as the two keys are depressed.	Refer to teletypewriter manual.
113	H (STOP) key	Depress FIGS, then H (STOP) keys.	Motor should stop.	
114	LINE BREAK switch	With POWER and MOTOR switches at ON, operate the switch to BREAK.	Motor should start when line is closed by releasing swicth.	Refer to teletypewriter manual.
115	Margin bell		Should ring on 66th character from left in standard circuit, on 70th character in weather circuits, and on 64th character in British circuits.	Refer to teletypewriter manual.
116	Ribbon-feed mechanism		Ribbon should be fed and lifted each time a character is typed.	Check seating of ribbon spools and driving collar.
117	Signal bell	Press FIGS key, then S key	Signal bell should ring	Check bell clapper and function punch bar.
118	LTRS and FIGS keys	Press FIGS, then LTRS keys (alternately) several times.	Platen should rise to upper case when FIGS key is depressed, and return to lower case when LTRS key is depressed.	Adjust platen shift; clean function punch bars.
119	CAR. RET	Type bar carriage at end of typed line (should also work from any part of typed line).	Type bar carriage returns to left	Check CAR. RET. link adjustment. Refer to the teletypewriter manual.
120	LINE FEED	Press LINE FEED key (usually operated after CAR. RET. to give sufficient time for carriage-return operation).	Paper rolls up one or two spaces as adjusted.	Examine line-feed sensing lever spring, and replace if necessary; check lever adjustment.
	Teletypewriter Reperforator Transmitter TT-76(*)/GGC.			
121	KEYBOARD switch	Place in SEND position. (SELECTOR switch in position 3).	Message typed on keyboard-transmitter will punch tape.	Check switch.
122	Tape feed (reperforator)	Depress space bar and hold REPEAT key depressed.	Paper tape should feed properly	Check paper tape reel guides.
123	END OF LINE INDICATOR lamp	Depress R and Y alternately	Lamp should light on operation of 66th character.	Check lamp and contacts.
124	CAR. RET. key	Depress key	When depressed, END OF LINE INDICATOR lamp should extinguish; indicator mechanism should return to zero position.	Refer to the reperforator manual.

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	Step No.	Unit	Action or condition	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE	125	REPEAT key	Repress and hold any key and the REPEAT key.	Selected character should repeat as long as both keys are held depressed.	Refer to the reperforator manual.
	126	BREAK key	Depress key	Opens signal line	Check key.
	127	Type wheel	Receive test message	Should be projected and restored for each operation and should shift to figures position properly.	Check bell crank assemblies and operation of the type wheel drive lever. Refer to the reperforator manual.
	128	Inking ribbon feed mechanism	Receive test message	Inking ribbon should feed as every other character is typed.	Check inking ribbon in guides and ribbon feed pawl action. Refer to the reperforator manual.
	129	Code and feed punches	Strike R and Y keys on keyboard	Tape with R's and Y's punched out of reperforator.	Check punch arm, code punch lever, and code hole punches. Refer to the reperforator manual.
	130	Manual tape feed-out lever	Move lever to left	Paper tape should feed-out; BLANK symbol will print on paper tape.	Check transfer lever trip latch, and manual tape feed-out linkage. Refer to the reperforator manual.
	131	Signal bell mechanism	Depress S key	Bell will ring when the machine is in the figures position and the S code group is received or sent.	Check signal bell sensing lever, clapper, and bell. Refer to the reperforator manual.
	132	Back-space lever	Operate lever	Paper tape should back space one space for each operation.	Check back-space pawl and spring. Refer to the reperforator manual.
	133	KEYBOARD switch	Operate to LOCK	No transmission possible from keyboard-transmitter.	Check switch.
	134	Transmitter-distributor	Test paper tape in position. STOP-START lever at START.	Transmitter-distributor should transmit from tape.	Check tight-tape and tape-out linkage and power supply. Refer to the reperforator manual
	135	Tight-tape lever (on transmitter-distributor).	Raise lever	Transmitter-distributor should stop.	Check tight-tape and tape-out linkage. Refer to the reperforator manual.
	136	Tape-out lever	End of message tape passes over tape-out lever.	Transmitter-distributor should stop.	Check tape-out lever, tape-out linkage, and switch. Refer to the reperforator manual.

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		Teletypewriter Reperforator Transmitter TT-76(*)/GGC			
	137	MOTOR switch	Turn to OFF	Motor should stop	Check action of switch.
	138	LIGHT switch	Turn to OFF	Light should be extinguished	Check switch.
	139	POWER switch	Turn to OFF	Supply of power to power supply and terminal unit is cut off.	Check switch.

	Step No.	Unit	Action or condition	Normal indication	Corrective measures
		Teletypewriter TT-98B/SG			
	140	MOTOR switch	Turn to OFF	Motor should stop	Check switch action.
	141	LIGHT switch	Turn to OFF	Lights extinguish	Check switch action.
	142	POWER switch	Turn to OFF	All power removed from equipment.	Check switch action.
		Frequency Shift Converter CV-278/GR.			
	143	SERVICE switch	Turn to OFF	Indicator light should extinguish	Check SERVICE switch.
		Radio Transmitter Modulator MD-203/GR.			
	144	POWER switch	Turn to OFF	Indicator light should extinguish	Check POWER switch.
		Radio Receiver R-292/URR			
	145	Function switch	Turn to STANDBY	Receiver is silent. Dial lamps remain lighted.	Refer to the receiver manual.
	146	Function switch	Turn to OFF	Dial lamps not lighted.	
		Radio Transmitter T-195/GRC-19			
	147	SERVICE SELECTOR switch	Turn to OFF	Dial lamps off. Dynamotors and blowers stop.	Refer to the transmitter manual.
		Interconnecting Box J-668/GR			
	148	CRYPT switch	Set at OFF	Crypt rotary converter stops	
	149	TTY switch	Set at OFF	TTY rotary converter stops.	
	150	BLOWER switch	Set at OFF	Blower stops.	
	151	MAIN POWER circuit breakers	Set at OFF	DC VOLTS meter falls off to 0.	
	152	LIGHTS switch	Set at OFF	Lights extinguish.	

STOP

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19. Heater Troubleshooting

The repair of a defective heater is to be performed at a higher echelon. If heater is inoperative, replace with new heater and forward the defective heater to a higher echelon for repair.

20. Tube Testing Techniques

When trouble occurs, check the fuses, all cabling, connections, and batteries before removing any tubes. Try to localize the trouble to a component or stage. If tube failure is suspected, use the applicable procedure to check the tubes. Check the tubes visually for obvious troubles such as open heaters.

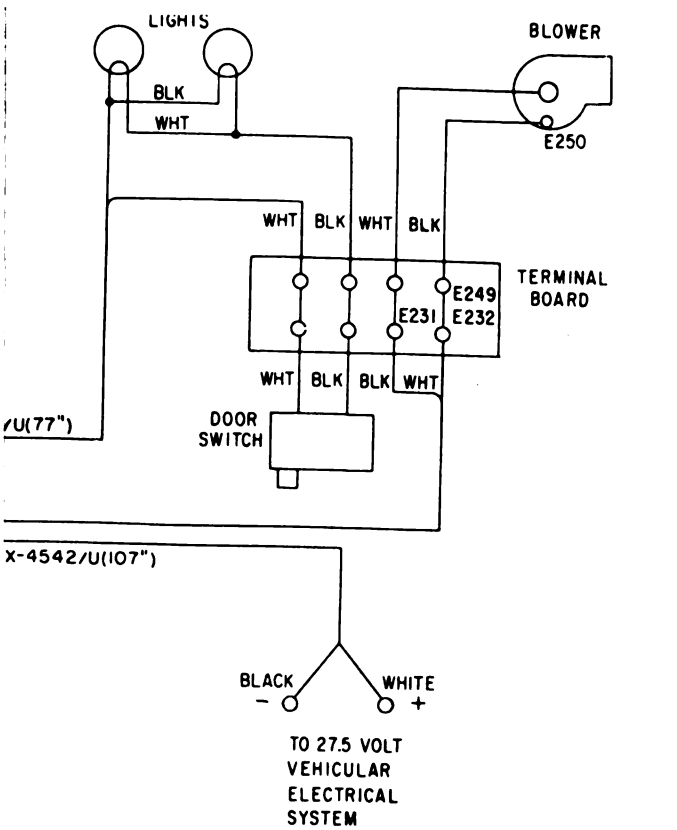
Caution: **Do not rock or rotate a tube when removing it from a socket; pull it straight out with a tube puller.**

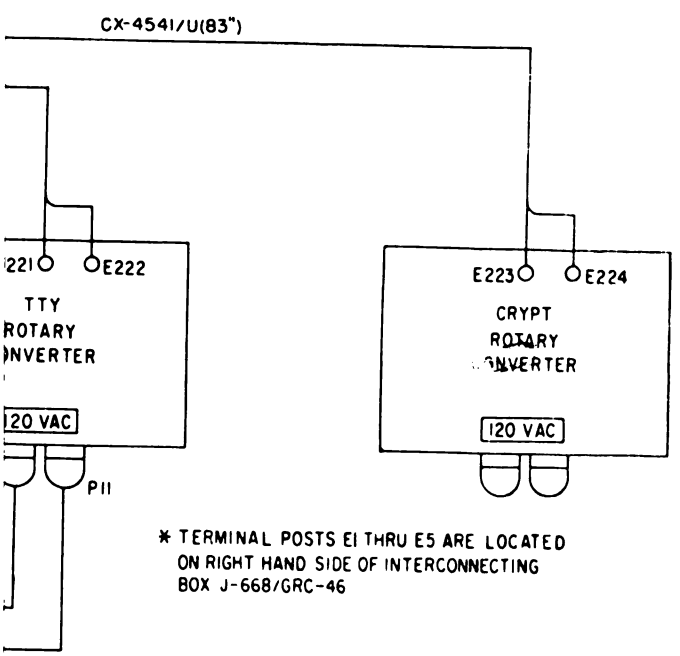
a. Use of Tube Tester. Remove and test one tube at a time. Discard a tube only if its defect is obvious or if the tube tester shows it to be defective. Do not discard a tube that tests at or near its minimum test limit on the tube tester. Put back the original tube, or insert a new one if required, before testing the next one.

b. Tube Substitution Method. Replace a suspected tube with a new tube. If the equipment remains inoperative, remove the new tube and put back the original tube. Repeat this procedure with each suspected tube until the defective tube is located.

c. Tube Replacement. For detailed instructions on tube replacement refer to the technical manual covering the equipment in question.

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* TERMINAL POSTS E1 THRU E5 ARE LOCATED ON RIGHT HAND SIDE OF INTERCONNECTING BOX J-668/GRC-46

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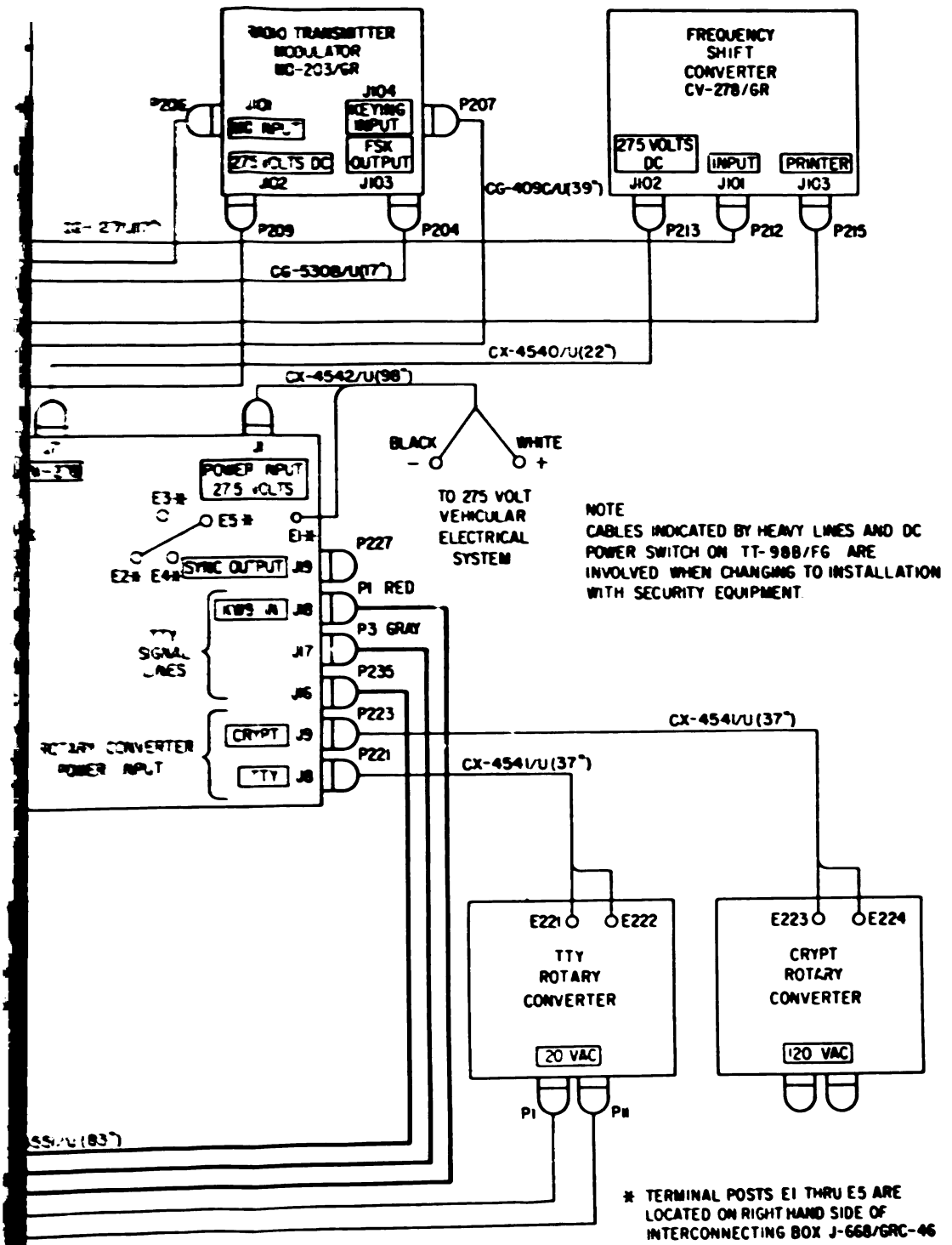


diagram for simplex connections.

TM5815-204-20-8

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CHAPTER 3
SHIPMENT AND LIMITED STORAGE

21. Disassembly of Equipment

The following instructions are recommended as a guide for preparing the Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29 for shipment and storage:

a. Radio Teletypewriter Set AN/GRC–46.

(1) Turn all the power switches off.

(2) Remove the main power cable from the truck battery and pull it into the shelter; replace the cap on the opening.

(3) Tighten all the shock mounts and equipment mounting bolts.

(4) Remove the inlet and outlet air ducts from the transmitter. Replace the covers to seal the air vents in the transmitter.

(5) Remove the whip antenna sections, rope, mast base, antenna lead, mast base bracket, and store them in the shelter.

(6) Remove the exhaust pipe from the heater, and store it in the shelter.

(7) Remove the ground strap and store it in the shelter.

(8) Empty the chad cup.

(9) Turn the two captivating hooks to lock the carriage in Teletypewriter TT–98B/FG. (See the applicable technical manual.)

b. Radio Teletypewriter Set AN/VRC–29.

(1) Perform procedures given in *a*(1) through (9) above.

(2) Remove all cables from the equipment.

(3) Remove the teletypewriter, reperforator, frequency-shift converter, modulator, junction box, receiver, and transmitter from the armored vehicle.

(4) Remove all components of the AN/VRC–29 from the vehicle.

22. Repackaging for Shipment or Limited Storage

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored. Adapt the procedures outlined below whenever possible. For information concerning the original packaging, refer to paragraph 4.

a. Material Required for AN/GRC–46. The following materials are required for packaging Radio Teletypewriter Set AN/GRC–46. For stock numbers of materials, refer to SB 38–100.

Material	Quantity
Twine (heavy)	215"
Waterproof bag (for manuals)	As required
Neutral paper	119"
Neutral envelopes (large size)	25"
Single face corrugated paper	135"
Kraft tape	As required
Pressure-sensitive tape	80"
Cloth bag	As required
Box (6¾" x 6¾" x 6¾" approx)	1
Wadding (Kimpack)	As required
Grade A paper	45"
Fiberglass Filament tape (½")	80"
Reverse tuck box (1" x 1" x 2$\frac{11}{16}$" approx).	5
Reverse tuck box ($\frac{11}{16}$" x $\frac{11}{16}$" x 2½" approx).	2
Reverse tuck box (6¾ x 6¾ x 6¾ approx).	1
Cellulose wadding	As required
Tissue	As required

b. Material Requirements for AN/VRC–29.

Material	Quantity
Wooden box (25" x 20⅛" x 24¼")	1
Strapping (⅝" x 91")	1
Strapping seals	2
Filler material	As required
No. 8 nails	As required
Staples	As required

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c. Material Requirements for Rotary Converter.

Material	Quantity
Corrugated carton (15 ¼ x 9⅛ x 11⅛)	1
Corrugated carton (14⅝ x 8⅞ x 10⅛)	1
Filler (9¾ x 39⅛)	1
Filler (9¾ x 46)	1
Foil bag (22⅛ x 28⅛)	1
Plywood base (14⅛ x 8¾ x ¼)	1
Kraft tape (3" x 70")	1
Neutral paper (18" x 36")	1
Carriage bolt (¼"-20 x 1")	4
Hexagonal nut (¼"-20)	4
Plain washer (¼" ID)	4
Pressure-sensitive tape (2" x 115⅛")	
Desiccant bags (16 unit)	3
Humidity indicator	1

d. Material Requirements for Mounting MT-791/U.

Material	Quantity
Corrugated carton (13¼" x 9" x 4")	1
Filler (3$\frac{1}{16}$" x 43⅝)	1
Filler (8$\frac{9}{16}$" x 12$\frac{1}{16}$)	1
Neutral paper (28" x 30")	1
Pressure-sensitive tape (2" x 102")	1

e. Material Requirements for Junction Box.

Material	Quantity
Corrugated carton (18" x 10¼" x 7⅞")	1
Filler (7⅝" x 55⅝")	1
Foil bag (21¼ x 31)	1
Corrugated carton (18⅝" x 10⅞" x 9")	1
Neutral paper (50" x 18")	1
Kraft tape (3" x 80")	1
Carriage bolts (¼"-20" x 1")	4
Hexagonal nuts (¼"-20")	4
Flat washer	4
Plywood base (18" x 10¼" x ¼")	1
Pressure-sensitive tape (2" x 124")	1
Desiccant bag (16 unit)	3
Humidity indicator	1
(Front panel protector plywood) (18" x 10¼" x ¼").	1

f. Material Requirements for Frequency-shift Converter.

Material	Quantity
Corrugated carton (19⅝" x 9$\frac{1}{16}$" x 8⅛").	1
Corrugated carton (9$\frac{1}{16}$" x 8¼" x 4")	1
Filler (32⅛" x 12⅛")	1
Filler (31$\frac{7}{16}$" x 14⅛")	1
Filler (9$\frac{1}{16}$" x 17")	1
Pressure-sensitive tape, 2 inches wide	205"
Grade A paper (24" x 37")	1
Foil bag (22½" x 28⅛")	1
(¼-inch plywood front panel protector) (9⅛" x 7⅝" x ¼").	1

g. Material Requirements for Modulator.

Material	Quantity
Corrugated carton (19⅝" x 9$\frac{1}{16}$" x 8⅛").	1
Corrugated carton 9$\frac{1}{16}$" x 8¼" x 4")	1
Filler (32⅛" x 12⅛")	1
Filler (31$\frac{7}{16}$" x 14⅛")	1
Filler (9$\frac{1}{16}$" x 17")	1
Pressure-sensitive tape, 2 inches wide	205"
Grade A paper (24" x 37")	1
Foil bag (22½" x 28⅛")	1
(¼-inch plywood front panel protector) (9⅛" x 7⅝" x ¼").	1

h. Bulk Material for AN/VRC-29.

(1) *Rotary Converters.* The following list of bulk material is required for packaging the two rotary converters:

Material	Quantity
Fiberboard	50 sq ft
Grade A paper	14 sq ft
3" wide tape	400"
¼" thick plywood	2 sq ft

(2) *Mountings MT-791/U.* The following list of bulk material is required for packaging the two Mountings MT-791/U:

Material	Quantity
Fiberboard	12 sq ft
Grade A paper	6 sq ft
3" wide tape	188"

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(3) *Radio Transmitter Modulator MD-203/GR and Frequency-Shift Converter CV-278/GR.* The modulator and frequency-shift converter have the same outside dimensions. The bulk material for packaging two units is given in the following list:

Material	Quantity
Fiberboard	33 sq ft
Grade A paper	24 sq ft
3" wide tape	288"
(¼"-thick plywood front panel protector).	1 sq ft

(4) *Junction box.* The following list of material is for packaging one interconnecting box:

Material	Quantity
Fiberboard	17 sq ft
Grade A paper	7⅛ sq ft
3" wide tape	225"
¼" thick plywood	1½ sq ft
(¼"-thick plywood front panel protector).	1½ sq ft

23. Packaging Radio Teletypewriter Set AN/GRC-46

Follow the procedure below for preparing the radio teletypewriter set for shipment and limited storage. The original packing list will be useful.

a. Disconnect exhaust hoses from Radio Transmitter T-195/GRC-19 and replace covers on the exhaust and intake to closed position.

b. Place the exhaust hoses in an envelope or bag and tie them with 45 inches of twine to the third mounting clamp of the transmitter.

c. Lock the slide shelves in position.

d. Clean out the chad bin.

e. In Electrical Equipment Shelter S-89C/G, close and secure the windows and blackout blinds. Clean the window glass.

f. Tighten the cable outlet caps.

g. Secure the covers on the ventilators.

h. Cover the holes of the exhaust port with one 8½-inch strip of 1-inch pressure-sensitive tape and 28-inch strip of 3-inch pressure-sensitive tape around the edge.

i. Cover the heater exhaust elbow with two 4-inch pieces of pressure-sensitive tape, 3 inches wide.

j. Cover the heater louver with one 5-inch strip of 3-inch pressure-sensitive tape.

k. Cover the ventilation fan outlet with a 10-inch strip of pressure-sensitive tape, 3 inches wide. Place 1 inch on the edge and fold it over to the sides and bottom. Place a 12-inch strip over the bottom and sides to make a complete closure.

l. Cover the antenna plate opening with a 3-inch strip of pressure-sensitive tape, 3 inches wide.

m. Pack the spare parts into the wooden spare parts box.

n. Touch up scratched paint on the shelter with pretreatment coating followed with olive-drab paint.

o. Clean the floor and walls with soap and water.

p. Secure the packaged wooden stakes to box No. 3 of the AN/GRC-19 with two bands of fiberglass filament tape.

q. Tie two 20-inch lengths of twine to each operator's seat support, positioned left and right toward the door, with the bottom twine placed on the floor toward the door.

r. Position the accessories box and wooden stakes between the heater compartment and place the seat supports over the twine. Tie the two ends on each side as tight as possible.

s. Tie the seat supports on each side with a 25-inch piece of heavy twine to avoid support rattle.

t. With a 50-inch piece of heavy twine, tie the seats across, from the left seat frame to the right seat frame; secure them as tight as possible.

u. Close the wooden box cover with the hook.

v. Close the door and lock the padlock. Place the two keys in the cloth bag and secure them to the handle with wire.

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24. Packing Radio Teletypewriter Set AN/GRC–46

Radio Teletypewriter Set AN/GRC–46 is to be protected by an open wooden crate. Construct the crate as shown in figure 1. Drain the fuel tank.

Material	Quantity
Wood crate MIL–C–182A, (87½" x 64½" x 62½) (ID) (7'9" long x 5'" wide x 6'1" high).	1
6 penny nails	As required
7 penny nails	As required
10 penny nails	As required
Strapping (nailed)	As required

25. Packaging Radio Teletypewriter Set AN/VRC–29

Package the components of Radio Teletypewriter Set AN/VRC–29 as outlined below if the original packaging is not available. (Refer to the applicable technical manuals and par. 23.)

a. Components. Cushion the component on all surfaces with pads of filler material. Place the cushioned unit within a wrap of corrugated cardboard. Secure the wrap with gummed tape.

b. Spares, Cables, etc. Wind each cable assembly into a coil of convenient dimension and tie it with cotton twine. Package the antenna mast, connectors, and adapters to insure mechanical and physical protection. Use filler material to cushion each item as required. Consolidate the miscellaneous components within a wrap of corrugated cardboard.

26. Packing Radio Teletypewriter Set AN/VRC–29

Pack each of the consolidated packages in a large nailed wooden box.

Material	Quantity
Wooden box (25" x 20⅛" x 24⅛") (ID).	1
Strapping (⅝")	91"
No. 8 nails	As required
Staples	As required

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APPENDIX I

REFERENCES

Following is a list of applicable references that are available to the unit repairman of Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29:

SB 38–100	Preservation, Packaging and Packing Materials, Supplies and Equipment Used in the Army.
TM 11–274	Radio Set AN/GRC–19.
TM 11–806	Radio Transmitter T–195/GRC–19.
TM 11–858	Radio Receiver R–392/URR.
TM 11–2225	Teletypewriter Sets AN/GGC–3 and AN/GGC–3A and Teletypewriter Reperforator-Transmitters TT–76/GGC, TT–76A/GGC, and TT–76B/GGC.
TM 11–2230	Teletypewriter Sets AN/FGC–20, AN/FGC–20X, and AN/UGC–4.
TM 11–5805–210–10	Operator's Manual: Frequency Shift Converter CV–278/GR.
TM 11–5805–210–20	Organizational Maintenance, Second Echelon: Frequency Shift Converter CV–278/GR.
TM 11–5815–204–10	Operator's Manual: Radio Teletypewriter Sets AN/GRC–46 and AN/VRC–29.
TM 11–5820–205–10	Operator's Manual: Radio Transmitter Modulator MD–203/GR.
TM 11–5820–205–20	Organizational Maintenance, Second Echelon: Radio Transmitter Modulator MD–203/GR.

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APPENDIX II

MAINTENANCE ALLOCATION CHARTS

The maintenance allocation charts for Radio Teletypewriter Set AN/GRC–46 and Radio Teletypewriter Set AN/VRC–29 are bound separately. They are identified as follows:

Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Radio Teletypewriter Set AN/GRC–46: TM 11–5815–224–20P.

Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Radio Teletypewriter Set AN/VRC–29: TM 11–5815–223–20P.

[AG 413.48 (20 Aug 59)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

L. L. LEMNITZER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

Def Atomic Spt Agcy (5)
USASA (2)
CNGB (1)
Tech Stf, DA (1) except
CSigO (18)
Tech Stf Bd (1)
USA Arty Bd (1)
USA Armor Bd (1)
USA Inf Bd (1)
USA AD Bd (1)
USA Abn & Elct Bd (1)
USA Avn Bd (1)
USA ATB (1)
USCONARC (5)
US ARADCOM (2)
US ARADCOM Rgn (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (1)
Armies (5) except
First US Army (7)
Corps (2)
Div (2)
USATC (2)
Svc Colleges (5)
Br Svc Sch (5) except
USASCS (29)
GENDEP (2) except
Atlanta GENDEP (None)
Sig Sec, GENDEP (10)
Sig Dep (17)
Army Pictorial Cen (2)
Engr Maint Cen (1)
USA Ord Msl Comd (3)
USASSA (15)
USASSAMRO (1)
USA Sig Pub Agcy (8)
USA Sig Engr Agcy (1)
USA Comm Agcy (2)
USA Sig Eqp Spt Agcy (2)
USA Sig Msl Spt Agcy (13)
WRAMC (1)
AFIP (1)
AMS (1)
Ports of Emb (OS) (2)
Trans Terminal Comd (1)
Army Terminals (1)
OS Sup Agcy (1)
Yuma Test Sta (2)
USA Elct PG (1)
Sig Lab (5)

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Sig Fld Maint Shops (3)
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57-5 (2)

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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