TM 11-5820-205-10

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL

RADIO TRANSMITTER MODULATOR MD-203/GR

This copy is a reprint which includes current pages from Changes 2 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1958

Change No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *16 October 1973*

Operator's Manual
RADIO TRANSMITTER MODULATOR MD-203/GR

TM 11-5820-205-10, 7 November 1958, is changed as follows:

Page 3, paragraph 1.1. Delete paragraph 1.1 and substitute new paragraph 1.1.

1.1. Indexes of Publications

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

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment. Paragraph 2. Delete paragraph 2 and substitute new paragraph 2.

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 (Army)/NAVSUP Pub 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps).

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 (Army)/NAVSUP Pub 459 (Navy)/AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

Add paragraph 2.1 after paragraph 2.

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 Publications) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, NJ 07703.

Page 4, paragraph 5. Cahnge the title of subparagraph *a* to:

Components and Dimensions.

Delete subparagraph *b* and insert new subparagraph *b*.

b. The following are running spares.

FSN	*Qty*	*Item*
5995-267-4198	1	Crystal Unit, Quartz: MIL type CR-36/U.
5960-100-7111	1	Electron tube MIL type 26A7.
5960-188-0827	2	Electron tube MIL type 26A6.
5960-188-0967	1	Electron tube MIL type 26D6.
5920-280-5039	4	Fuse, cartridge 3 AG type MIL type F03G3R00B.
6240-155-8714	4	Lamp, incandescent 28v, AN Std AN3121-313.

After subparagraph *b* add subparagraph *c*.

c. Items Comprising an Operable Radio Transmitter Modulator MD-203/GR (FSN 5820-543-1672).

FSN	*Qty*	*Nomenclature part No., and mfr code*
		NOTE The part number is followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency, etc.
5955-267-4198	1	Crystal Unit, Quartz, CR36/U, 81349.

Page 17, appendix II.
Delete appendix II.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
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 (qty rqr block no. 769), Operator requirements for MD-208/GR.

U.S. GOVERNMENT PRINTING OFFICE: 1973-761 10/264
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TM 11-5820-205-10
C 3

Operator's Manual
RADIO TRANSMITTER MODULATOR MD-203/GR

CHANGE
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *12 December 1963*

TM 11-5820-205-10, 7 November 1958, is changed as follows:

Note. The parenthetical reference to previous changes (example: "page 2 of C 2") indicates that pertinent material was published in that change.

Page 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 (types 4, 6, 7, 8 and 9), supply bulletins, lubrication orders, and modification work orders 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.

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 by use of 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, N. J. 07703. One information copy will be furnished to the individual's immediate supervisor (officer, noncommissioned officer, supervisor, etc.).

Page 11. Delete paragraphs 14 and 15 and substitute:

14. Scope of Maintenance

The maintenance duties assigned to the operator of the MD-203/GR are listed below together with a reference to the paragraphs covering the specific maintenance functions. No tools and test equipment are required.

a. Daily preventive maintenance checks and services (par. 15.2).

b. Monthly preventive maintenance checks and services (par. 15.3).

c. Cleaning (par. 15.4).

15. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in

paragraphs 15.1 through 15.4 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (pars. 15.2 and 15.3) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the *References* column lists the illustrations, paragraphs, or manuals that contain supplementary information. If the defect cannot be remedied by the operator, higher echelon maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38–750.

Add paragraphs 15.1 through 15.4 after paragraph 15.

15.1. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the equipment are required daily and monthly.

a. Paragraph 15.2 specifies the checks and services that must be accomplished daily or under the conditions listed below:

(1) When the equipment is initially installed.

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

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

b. Paragraph 15.3 specifies *additional* checks and services that must be performed monthly.

15.2. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedures	References
1	End item equipment	Inspect equipment for completeness	App. II.
2	Exterior surfaces	Clean exterior surfaces. Check indicator lens for cracks	Par. 15.4.
3	Connectors	Check tightness of all connectors	
4	Controls	While making operating checks (item 5), observe that mechanical action of each switch is smooth and free of external or internal binding, and that there is no excessive looseness (fig. 1).	
5	Operation	Operate equipment according to paragraphs 12, 13, and 17. During operation, be alert for any unusual signs or conditions.	

15.3. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cables	Inspect cords, cables, and wires for chafed, cracked, or frayed insulation	
2	Fasteners	Inspect Dzus fasteners for looseness	
3	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion	
4	Fuse	Inspect fuse for proper value; tighten cap	Par. 18b.
5	Mounting	a. Inspect grounding strap for frayed portions and tightness	Fig. 3.
		b. Inspect rubber shock mounts for cracks, moisture, dirt, and tightness	Fig. 3.
		c. Check levers for proper operation	Par. 8.
6	Operation	Check equipment for normal operation	Pars. 12, 13, and 17.

15.4. Cleaning

Inspect the exterior of the equipment. The exterior surfaces should be free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean, soft cloth.

Warning: **Cleaning Compound (FSN 7930–395–9542) is flammable and its fumes are toxic. Provide adequate ventilation. *Do not* use near a flame.**

b. Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with cleaning compound.

c. Remove dust or dirt from plugs with a brush.

d. Clean the front panel and switch knobs; use a soft, clean cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

Page 12. Delete figure 6.

Page 13. Delete figure 7.

Page 16. Add the following APPENDIX I:

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

Page 17, appendix II (page 2 of C 2). Delete paragraphs 2, 3, and 4.

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, Section II (Unclas) requirements for Nike-Ajax, Nike-Hercules and Hawk — TM — Radio.

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TECHNICAL MANUAL

Operator's Manual

RADIO TRANSMITTER MODULATOR MD-203/GR

TM 11-5820-205-10
CHANGES No. 2

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *27 June 1960*

TM 11-5820-205-10, 7 November 1958, is changed as follows:

*These changes supersede C 1, 13 March 1959.

APPENDIX II

BASIC ISSUE ITEMS

(Superseded)

SECTION I. INTRODUCTION

1. Scope

a. This appendix lists items supplied for initial operation and for running spares. The list includes tools, accessories, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

b. Columns are as follows:

(1) *Source, maintenance, and recoverability code.* Not used.

(2) *Federal stock number.* The stock number column lists the 11-digit Federal stock number.

(3) *Designation by model.* Not used.

(4) *Description.* Nomenclature or the standard item name and brief identifying data for each item is listed in this column. When requisitioning, enter the nomenclature and description on the requisition.

(5) *Unit of issue.* The unit of issue is the supply medium by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(6) *Expendability.* Expendable items are indicated by the letter X; nonexpendable items are indicated by NX.

(7) *Quantity authorized.* Under "Items Comprising an Operable Equipment" the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spares and Accessories" the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

(8) *Illustration.* The "Item No." column lists the reference designations that appear on the part in the equipment. These same designations are also used on any illustrations of the equipment.

2. Critical Items

A zero slash (ø) in the "Description" column indicates items that are expected to fail during the first year; also items that will make the equipment inoperative if they fail.

3. References

A Maintenance Allocation Chart showing all repair operations authorized to be performed by the respective echelons of maintenance is contained in TM 11-5820-205-20.

4. Comments or Suggestions

Any comments concerning omissions and discrepancies will be prepared on DA Form 2028 and forwarded direct to Commanding Officer, U. S. Army Signal Equipment Support Agency, ATTN: SIGFM/ES-ML, Fort Monmouth, N. J.

SECTION II. FUNCTIONAL PARTS LIST

(1) SOURCE MAINTENANCE AND RECOVERABILITY CODE	(2) FEDERAL STOCK NUMBER	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATIONS FIGURE NO	(9) ILLUSTRATIONS ITEM NO
			ITEMS COMPRISING AN OPERABLE EQUIPMENT					
			MODULATOR, RADIO TRANSMITTER MD-203/GR					
	5820-543-1672		MODULATOR, RADIO TRANSMITTER MD-203/GR	ea	NX			
	Order thru AGC		TECHNICAL MANUAL TM11-5820-205-10P	ea	X	2		
			RUNNING SPARES AND ACCESSORY ITEMS					
			MODULATOR, RADIO TRANSMITTER MD-203/GR					
	5955-267-4198		@ CRYSTAL UNIT, QUARTZ: MIL type CR36/U	ea	NX	1		Y101 Y102
	5960-100-7111		@ ELECTRON TUBE: MIL type 26A7	ea	X	1		V108
	5960-188-0827		@ ELECTRON TUBE: MIL type 26A6 Item Nos: V102 thru V104, V106, V107	ea	X	2		See desc column
	5960-188-0987		@ ELECTRON TUBE: MIL type 26D6	ea	X	1		V101 V105
	5920-280-5039		@ FUSE, CARTRIDGE: 3 AG type; MIL type FO3G3R00B	ea	X	4		F101
	6240-155-8714		@ LAMP, INCANDESCENT: 28 v, AN Std AN3121-313	ea	X	4		I101

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.

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44-116	44-448	55-11	55-116
44-235	44-500	55-12	55-126
44-236	44-535	55-16	55-500 (AA-AE)
44-435	44-536	55-46	55-510
44-436	44-537	55-57	57
44-437	44-545	55-75	57-5

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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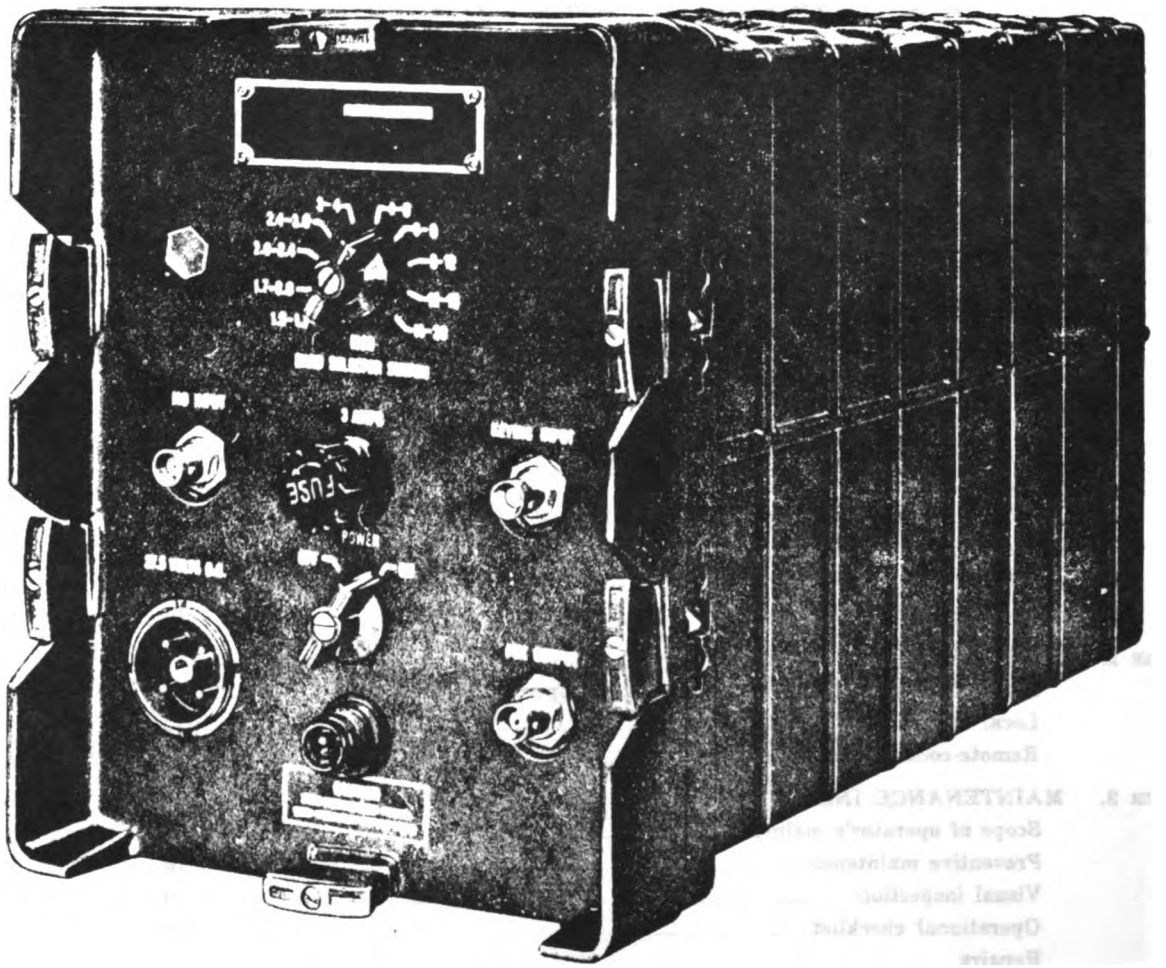
TECHNICAL MANUAL
No. 11-5820-205-10

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *7 November 1958*

RADIO TRANSMITTER MODULATOR MD-203/GR
OPERATOR'S MANUAL



TM650-1

Figure 1. Radio Transmitter Modulator MD-203/GR.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual describes Radio Transmitter Modulator MD-203/GR and covers its operation and operator's maintenance. It includes instructions for cleaning and inspection of the equipment and replacement of parts available to first echelon maintenance.

b. For information on the operation of the Radio Transmitter Modulator MD-203/GR as part of a complete system, refer to TM 11-5815-204-10.

c. The maintenance allocation chart is included in TM 11-5820-205-20.

2. Forms and Records

a. Unsatisfactory Equipment Report. Fill out and forward DA Form 468 (Unsatisfactory Equipment Report), to the Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., as prescribed in AR 700-38.

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.

c. Preventive Maintenance Form. Prepare DA Form 11-238 (figs. 6 and 7) (Maintenance Check List for Signal Equipment (Sound Equipment, Radio, Direction Finding, Radar, Carrier, Radiosonde and Television)), in accordance with instructions on the form.

d. Parts List Form. Forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts List or Supply Manuals 7, 8, and 9), direct to the Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., with comments on parts listings in appendix II.

e. Comments on Manual. Forward all other comments on this publication direct to the Commanding Officer, U. S. Army Signal Publications Agency, Fort Monmouth, N. J.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Radio Transmitter Modulator MD-203/GR provides for the conversion of continuous wave (cw) transmitter signals into frequency shifted radioteletype signals by introducing selectable amounts of frequency shift into the exciter circuit of the radio transmitter.

b. The modulator was designed specifically for use with Radio Transmitter T-195/GRC-19, but can provide frequency-shift keying (fsk) facilities for any transmitter having an exciter output with a fundamental frequency range of 1.5 to 3 megacycles (mc) and a minimum output of 1 volt.

c. Radio Transmitter Modulator MD-203/GR and Radio Transmitter T-195/GRC-19 are incorporated in Radio Teletypewriter Sets AN/GRC-46 and AN/VRC-29. These radio sets are transportable vehicular installations. Figure 2 is a simplified block diagram of Radio Transmitter Modulator MD-203/GR being used as part of a radio set.

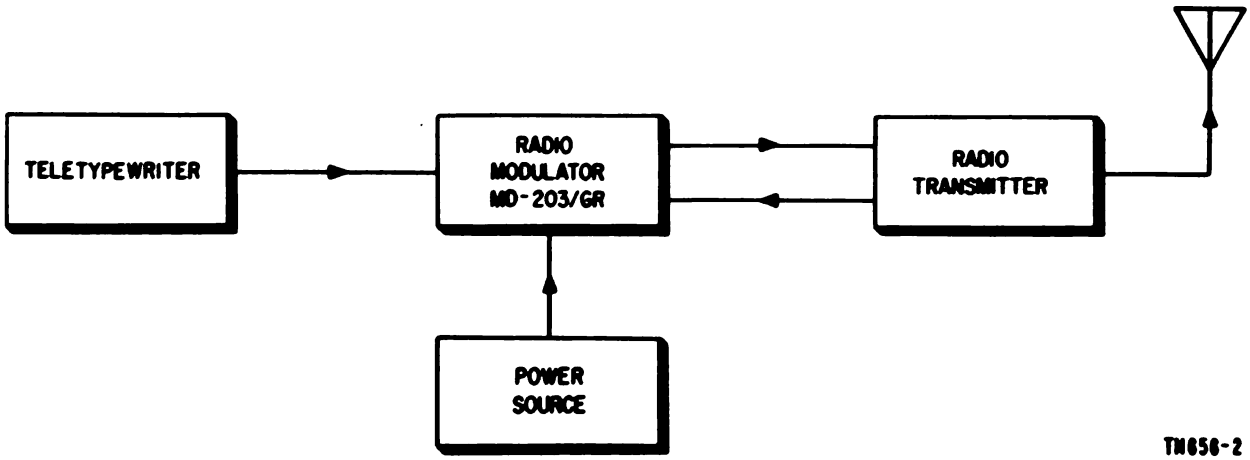


Figure 2. Radio Transmitter Modulator MD-203/GR, functional system block diagram.

4. Technical Characteristics

Number of tubes .....7.
Input frequency range .....1.5 to 3 mc.
Output frequency range .....1.5 to 3 mc.
Input level .....1 volt minimum.
Output level .....Adjustable between .5 and 4.5 volts over the frequency range.
Shift magnitude .....850, 425, 212, or 106 cycles.
Frequency-shift selection .....Manual.
Type of operation .....Frequency-shift keying.
Power requirements .....1.8 amperes at 27.5 volts dc.
Power supply .....24-volt vehicular electrical supply.
Weight (in case) .....18.5 pounds.

5. Components of Radio Transmitter Modulator MD-203/GR

a. Components. The components of Radio Transmitter Modulator MD-203/GR are listed in the following chart:

Quantity	Item	Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
1	Radio Transmitter Modulator MD-203/GR.	9⅛	13¾	7¼	23½
1	Mounting MT-791/U	3¾	12½	8½	15
1	Set of running spares (*b* below)	8½	9	4	9
1	RF Cable Assembly CG-530/U (20 in.).				
1	RF Cable Assembly CG-530B/U (32 in.).				
1	Cord CG-409C/U (4 ft 3 in.)				
1	Electrical Power Cable Assembly CX-4540/U (3 ft).				
2	TM 11-5820-205-10	10¼	½	8	1½

b. Running Spares. The following running spares are supplied with each Radio Transmitter Modulator MD-203/GR:

Quantity	Item
4	Fuses, 3 amperes, 125 volts, slow-blow.
1	Electron tube, 26A7GT.
2	Electron tubes, 5907.
1	Electron tube, 5908.
3	Lamps, .060 ampere, 2 volts, type 49.
2	Crystal diodes, 1N81.
1	Crystal Unit CR-18/U, 12 mc.
1	RF Cable Assembly CG-530B/U (20 in.)
1	RF Cable Assembly CG-530B/U (32 in.)
1	Cord CG-409C/U (4 ft. 3 in.).
1	Electrical Power Cable Assembly CX-4540/U (3 ft.).

6. Nomenclature and Common Name

A list of the nomenclature assignments for the compcnents of Radio Transmitter Mcdulator MD-203/GR is given below. A common name is indicated after each item.

Nomenclature	Common name
Radio Transmitter Modulator MD-203/GR.	Modulator.
Mounting MT-791/U	Mounting.
Electrical Power Cable Assembly CX-4540/U	Power cable.
RF Cable Assembly CG-530B/U	Coaxial cable.
Cord CG-409C/U	Cord.

7. Description of Radio Transmitter Modulator MD-203/GR

(fig. 1)

a. Radio Transmitter Modulator MD-203/GR is housed in a sturdy, olive-drab, cast aluminum, waterproof case that is designed to withstand conditions encountered in mobile (vehicular) military service. The case is mounted on a shockproof mounting base (fig. 3). The chassis of the modulator is fastened within the case by six captive fasteners which are mounted around the edges of the front panel. A watertight seal between the panel and the case maintains the immersion-proof feature of the modulator. The entire modulator consists of a panel, chassis, subchassis assembly, and a separate outer case.

b. All of the operating controls and connectors are located on the front panel (fig. 5) which is recessed so that no control extends beyond the raised edges of the panel.

c. At the upper part of the front panel is a ten-position band selector switch. Below this switch is the 3 AMPS FUSE, the POWER switch, and an indicator lamp. To the left is the 27.5 VOLTS D. C. power receptacle, used to connect the modulator to the electrical system through the junction box. This receptacle has an internally threaded central bushing for securing the power cable plug. The MO INPUT and FSK OUTPUT coaxial connectors provide for the frequency (rf) and output. The KEYING INPUT receptacle provides the input for the keying signal.

8. Description of Mounting MT-791/U

(fig. 3)

The mounting is steel-constructed, and consists essentially of an upper and a lower platform separated by four shock mounts. The lower platform is drilled to accommodate bolts for fastening the mounting rigidly to a vehicle. Four hooks are attached to the upper platform and they are moved by the two levers on the front of the mounting to engage four pins in the bottom of the case of the modulator. The levers are locked in detent in the closed position. A grounding strap is attached to the upper platform.

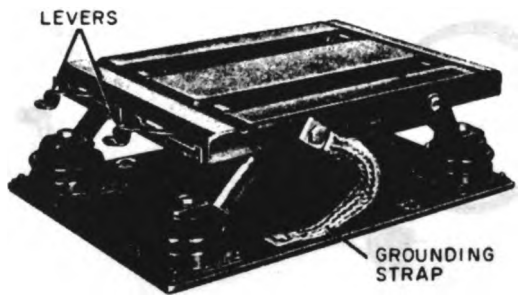


Figure 3. Mounting MT-791/U, front oblique view.

9. Description of Minor Components

The minor components of Radio Modulator MD-203/GR are shown in figure 4. The case for running spares is a fiberboard box for storing spare parts. Compartments are provided for tubes, fuses, lamps, and other replacement parts.

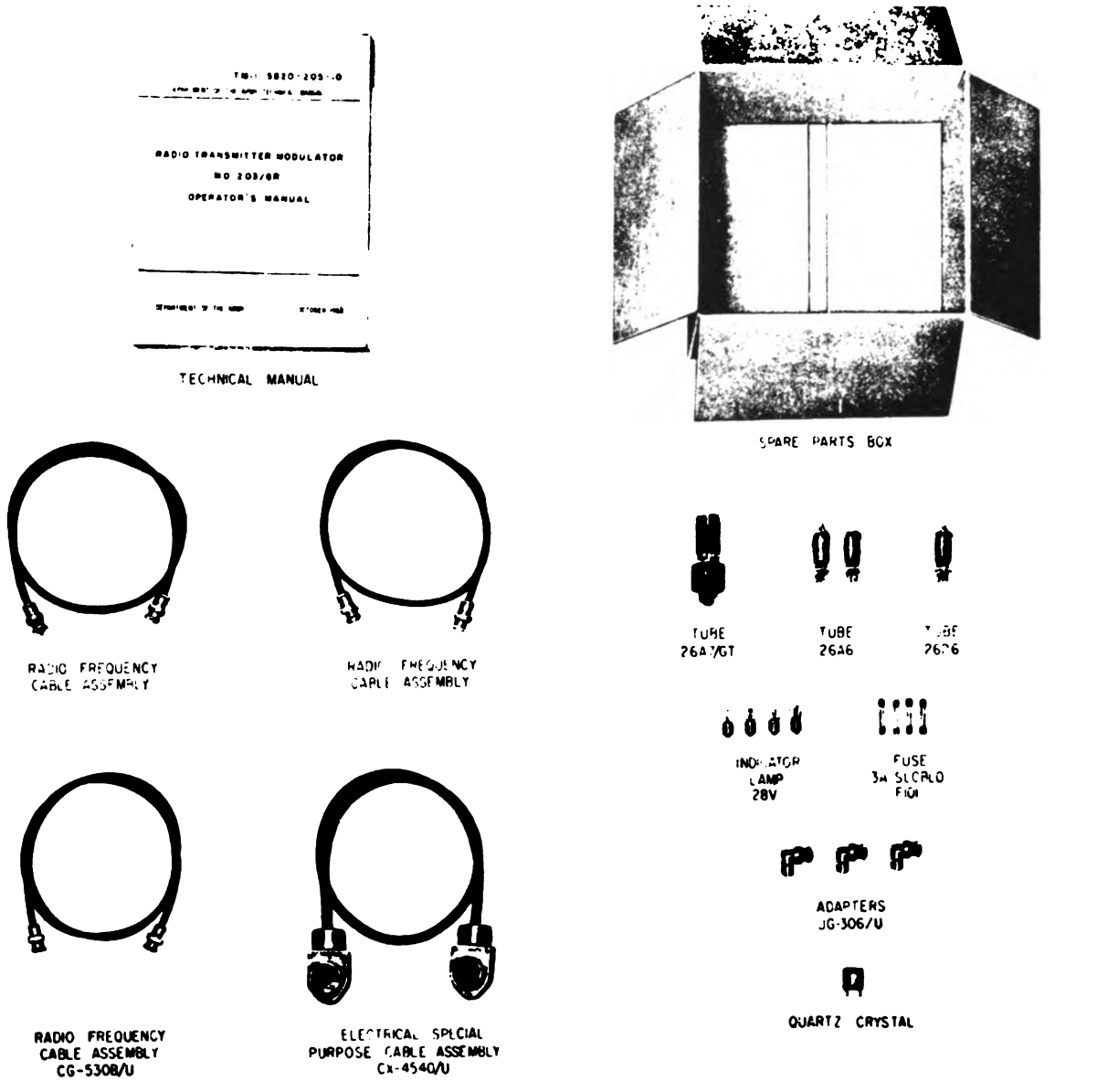


Figure 4. Radio Transmitter Modulator MD-203/GR, minor components.

10. Additional Equipment Required

The following equipment is not supplied as part of Radio Transmitter Modulator MD-203/GR but is needed for use with the modulator:

a. Radio Transmitter T-195GRC-19. Radio

a. Radio Transmitter T-195/GRC-19. Radio Transmitter, T-195/GRC-19, or one having the same exciter frequency range and equipped with receptacles, is used for connecting the modulator to the transmitter.

b. Interconnecting Box J-668/GR. The interconnecting box is a part of the installation kit required for remote-control operation of Radio Transmitter Modulator MD-203/GR. In these installations, the modulator receives its 27.5-volt direct-current (dc) power through the

interconnecting box, and the keying input to the modulator comes from local or remote teletypewriter facilities through the polar relay in the interconnecting box.

c. Reperforator Transmitter Teletypewriter TT-76A/GGC or Teletypewriter TT-098B/SG. The teletypewriter is a part of the instalation kit required for the transmission of characters as electrical impulses, and the reception and printing of characters to correspond with the impulses received.

d. Power Source. For vehicular operation, the power source would consist of the vehicle's electrical system or 24-volt battery.

11. Radio Transmitter Modulator MD-203/GR Operating Controls

(fig. 5)

The following chart lists the operating controls and their functions:

Control	Function
POWER switch....	Turns modulator on and off.
MCS BAND SELECTOR SWITCH	When set to the same band as the radio transmitter (as read on the BAND indicator on Radio Transmitter T-195/GRC-19, the switch reduces the frequency shift of the modulator by a factor which nullifies the frequency-shift multiplication obtained in the subsequent multiplier stages of the radio transmitter, for that band of frequencies.

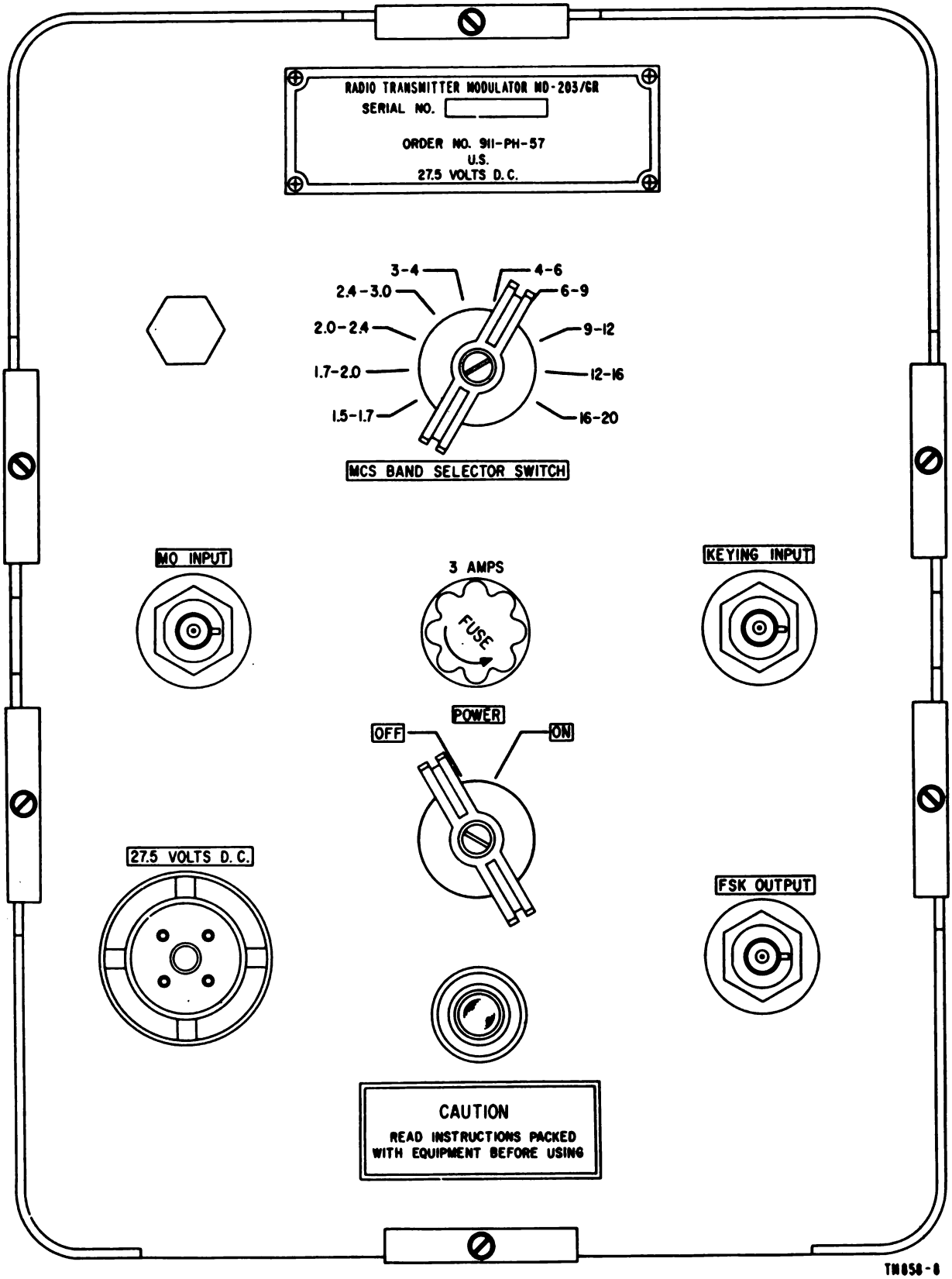


Figure 5. Radio Transmitter Modulator MD-203/GR, operating controls.

12. Local Operation

To operate Radio Transmitter Modulator MD-203/GR locally, proceed as follows:

a. Turn the POWER switch of the modulator to ON. The indicator should light. Allow approximately 5 minutes for the modulator to warm up.

b. Set the MC BAND SELECTOR SWITCH to correspond to the frequency of operation of the radio transmitter, or to read the same as the BAND indicator on Radio Transmitter T-195/GRC-19.

13. Remote-Control Operation

In Radio Teletypewriter Sets AN/GRC-46 and AN/VRC-29 remote control operation of the modulator is accomplished as follows:

a. The SEND-REC-MARK HOLD switch on the equipment shelf, closes the keying circuit in the modulator when the switch is in the RECEIVE position.

b. Also in these installations, the modulator receives its 27.5-volt dc power through Interconnecting Box J-668/GRC-46, and the keying input to the modulator is applied from local or remote teletypewriter facilities.

c. To stop the modulator, turn the POWER switch to the OFF position.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

14. Scope of Operator's Maintenance

a. The following is a list of maintenance duties normally performed by the operator of Radio Transmitter Modulator MD-203/GR. These procedures do not require special tools or test equipment.

b. Operator's maintenance of the modulator consists of the following:

(1) Preventive maintenance (par. 15).
(2) Visual inspection (par. 16).
(3) Operational checklist (par. 17).
(4) Checking cable connections.

15. Preventive Maintenance

a. DA Form 11-238. DA Form 11-238 (figs. 6 and 7) is a preventive maintenance checklist to be used by the operator. Items not applicable to the modulator are lined out in the figures. References in the item block in the figures are to paragraphs that contain additional maintenance information pertinent to that particular item. Instructions for the use of the form appear on the form.

b. Items. The information shown in this subparagraph is supplementary to DA Form 11-238. The item numbers correspond to the item numbers on the form.

Item	Maintenance procedures
1	Visually check the modulator for completeness, particularly all minor components such as cables and connectors.
2	Use a clean cloth to remove dust, dirt, moisture, and grease from connectors, cables, and front panel controls. If necessary, wet the cloth with cleaning compound and then wipe the parts with a dry clean cloth.
3	Both control knobs should work smoothly, be tight on the shaft, and should not bind. Tighten all loose knobs and be sure that the knobs do not rub against the panel.
6	Remove rust from components and touch up bare spots with paint.
7	Repair any cuts in the insulation by covering them with rubber tape and then with friction tape. Replace or repair all broken cords or cables.

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

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
26. ~~INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.~~	
27. ~~OILCAN FOR NORMAL OPERATION.~~	
28. ~~BEFORE SHIPPING OR STORING, REMOVE BATTERIES~~	

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

ITEM 10 - CONNECTOR DAMAGED ON CABLE ASSEMBLY. POWER, ELECTRICAL CX-4544/U REPORTED TO 2ND ECHELON FOR REPLACEMENT.

FOLD

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

EQUIPMENT NOMENCLATURE

RADIO TRANSMITTER MODULATOR MD-203/GR

EQUIPMENT SERIAL NUMBER

1234

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
✓		7 OCT 1958	FRANK LEE

DA FORM 1 MAY 57 11-238

REPLACES DA FORMS 11-238, 1 NOV 55; 11-239, 11-244, 11-245, 11-246, 11-249, 11-250, AND 11-251, WHICH ARE OBSOLETE

TM5820-205-10-9

Figure 6. DA Form 11-238 (pages 1 and 4).

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

DAILY CONDITION FOR MONTH OF OCTOBER 1958

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

	WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5	CLEAN AND TIGHTEN EXTERIORS OF CASES, RACKS, MOUNTS, [illegible]	✓					
6	INSPECT CASES, MOUNTS, ANTENNA TOWERS AND EXPOSED METAL SURFACES FOR RUST, CORROSION. PAR. 15	✓					
7	INSPECT CORDS, CABLE, WIRE, SHOCK MOUNTS FOR CUTS, KINKS, BREAKS, FRAYING UNDUE STRAIN PAR. 15	X					
8	CHECK ANTENNA GUY WIRES FOR PROPER TENSION OR DAMAGE						
9	INSPECT CANVAS AND LEATHER ITEMS FOR MILDEW, TEARS, FRAYING						
10	INSPECT ACCESSIBLE ITEMS FOR LOOSENESS, SWITCHES, KNOBS, JACKS, CONNECTORS, RELAYS, TRANSFORMERS, MOTORS, PILOT LIGHTS, CLAMPS, ETC	✓					
11	CLEAN AND/OR INSPECT AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS	✓					
12	INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, SPECIFIC GRAVITY, DAMAGED CASES. INSPECT DRY BATTERIES FOR LEAKAGE.						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
13 INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER PROOFING, TEARS, FRAYING.	
14 CHECK TERMINAL BOX COVERS FOR GASKETS, DIRT, LEAKS, DAMAGED GASKETS, GREASE.	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15 INSPECT CASING OF RADIO SET ASSEMBLIES FOR CUT ITEMS, TUBES, LAMPS, FUSES, CRYSTALS, CONNECTORS, VIBRATORS, PLUG-IN COILS	
16 INSPECT RELAYS AND CIRCUIT BREAKERS FOR LOOSE MOUNTINGS, DAD CONTACTS AND ALIGNMENT OF CONTACTS AND SPRINGS, PROPER SPRING TENSION	
17 INSPECT VARIABLE CAPACITORS FOR DIRT, MISALIGNMENT OF PLATES, LOOSE MOUNTINGS, MOISTURE	
18 INSPECT RESISTORS, BUSHINGS 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	
20 INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND CREEPAGE	
21 INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR DIRT, CORROSION, LOOSE CONTACTS	
22 INSPECT TRANSFORMERS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR SUBMERGING AND OIL LEAKAGE.	
23 INSPECT GENERATORS, AMPLIDYNES, SYNCHROS FOR BRUSH WEAR, SPRING TENSION, ARCING AND PITTING OF COMMUTATOR	
24 INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS	
25 INSPECT WAVEGUIDE GASKETS FOR LEAKS, WORN OR LOOSE PARTS.	

CONTINUED ON PAGE 4

2 3

Figure 7. DA Form 11-238 (pages 2 and 3).

16. Visual Inspection

a. When the equipment fails to perform properly, turn off the power and check all the items listed below. *Do not check any item with the power on.*

(1) Wrong settings of switches and controls (par. 13).
(2) Cables and connectors poorly connected.
(3) Disconnected cables or connectors.
(4) Poor ground connection.
(5) Burned out fuse (usually indicates some other fault).

b. If the above checks do not locate the trouble, proceed to the operational checklist (par. 17).

17. Operational Checklist

a. General. The operational checklist will help the operator to locate the trouble quickly. The corrective measures are used to repair this trouble. If the measures suggested do not restore normal equipment performance, trouble-shooting is required by a field radio repairman. Note on the repair tag what corrective measures were taken and how the equipment performed at the time of failure.

b. Procedure. Place the set in operation (par. 13). After the equipment warms up, perform the steps shown in *c* below, in the order given. Observe the equipment operation and perform any corrective measures necessary.

c. Operational Checklist.

Action	Normal indication	Corrective measures
1. Turn POWER switch to ON	Power indicator lamp should light.	Check fuse F101, lamp (par. 19), and power cable. Check power supply. If fuse F101 continues to burn out, higher echelon repair is required.
2. Turn BAND SELECTOR SWITCH on the modulator to each position in turn. Tune the T-195/GRC-19 to a frequency within the band indicated by the BAND SELECTOR SWITCH position.	PA GRID meter on T-195/GRC-19 should indicate in white segment.	Higher echelon repair required.

18. Repairs

a. Replacement of Power Indicator Lamps.

(1) Turn the glass indicator jewel counterclockwise and pull out to expose the defective lamp.
(2) Press down on the lamp and turn it counterclockwise to unlock.
(3) Pull the defective lamp out and replace it with a new one. Push the replacement lamp in and twist it clockwise to lock.

b. Replacement of 3 AMPS Fuse.

(1) Push in on the fuse cap.
(2) Turn the fuse cap counterclockwise to unlock.
(3) Pull out the defective fuse (attached to fuse cap), and replace it with a new one of the correct rating (3 amperes). Plug the new fuse into the fuse cap, push the fuse and cap in and twist it clockwise to lock.

CHAPTER 4
SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

19. Disassembly of Equipment

Disassembly procedures for the modulator consists of the following steps:

a. Disconnect the cables from the front panel of the modulator.

b. Remove the modulator from the mounting by lifting the two levers at the front of the mounting to clear the detents. Move them all the way to the left, and then lift the modulator from the mounting.

c. Remove the mounting bolts and remove the mounting.

20. Repackaging for Shipment or Limited Storage

Repackaging of Radio Transmitter Modulator MD-203/GR is covered in TM 11-5820-205-20.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

21. Authority for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. The destruction procedures outlined in paragraph 22 will be used to prevent further use of the equipment.

22. Methods of Destruction

Use any of the following methods to destroy the equipment:

a. Smash. Smash the controls, tubes, coils, switches, capacitors, and transformers; use sledges, axes, handaxes, pickaxes, hammers, or crowbars.

b. Cut. Cut the power and coaxial cables and slash all shields; use axes, handaxes, or machetes.

c. Burn. Burn cords and technical manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panel and cabinet.

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

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

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

APPENDIX I
REFERENCES

Following is a list of applicable references that are available to the operator of Radio Transmitter Modulator MD-203/GR:

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

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

APPENDIX II
OPERATOR'S REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

1. Scope

a. This appendix lists items supplied for initial operation and for running spares. The list includes tools, accessories, and similar material issued as part of the major end item. This portion includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents which are a basis for requisitioning.

b. The columns are defined as follows:

(1) *Federal or technical service stock number.* The stock number column lists the 11 digit Federal stock number. In the absence of a Federal stock number, the technical service stock number will be used for requisitioning purposes.

(2) *Repair parts source, maintenance and recoverability code.* (Not used).

(3) *Designation by model.* (Not used).

(4) *Description.* Nomenclature of the standard item name and brief identifying data for each item is listed in this column. When requisitioning, enter the nomenclature and description.

(5) *Unit of issue.* The unit of issue is the supply term applied to the smallest quantity by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(6) *Expendability.* Expendable items are indicated by the letter X; nonexpendable items are indicated by NX.

(7) *Quantity authorized.* Under items comprising an operable equipment the column lists the quantity of items supplied for the initial operation of the equipment. Under running spares and accessories the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

(8) *Illustrations.* The item No. column lists the reference designations that appear on parts in the equipment.

2. Comments or Suggestions

Any comments concerning omissions and discrepancies in this manual will be prepared on DA Form 2028 and forward direct to Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., ATTN: SIGFM/ES-ML.

Section II. FIRST ECHELON REPAIR PARTS AND SPECIAL TOOLS LIST

(1) FEDERAL OR TECHNICAL SERVICE STOCK NUMBER	(2) REPAIR PARTS SOURCE, MAINTENANCE AND RECOVERABILITY CODE	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATION FIGURE NO.	(9) ILLUSTRATION ITEM NO.
			ITEMS COMPRISING AN OPERABLE EQUIPMENT					
			MODULATOR, RADIO TRANSMITTER MD 203/GR					
			†† NOTE: AN APPLICABLE STOCK NUMBER IS IN THE PROCESS OF ASSIGNMENT. IN APPROXIMATELY 90 DAYS A CHANGE WILL BE ISSUED INDICATING THE APPROPRIATE STOCK NUMBERS FOR REQUISITIONING PURPOSES: AN INTERIM NUMBER WHICH APPEARS IN THE DESCRIPTION COLUMN HAS BEEN INCLUDED AND MAY BE USED TO IDENTIFY ITEMS FOR EMERGENCY USE.					
			MODULATOR, RADIO TRANSMITTER MD 203/GR: 150 mw max pwr output; 1.5 to 3 mc freq; 470 ohm input, 1000 ohm output impedance; 27.5 v oper pwr; 7 5/16 in x 9 1/16 in x 14 7/8 in o/a; SWED part No. 01X200128 †† L8Ra11E 1 (SEE NOTE PAGE 1)	ea	NX			
			BARE UNIT FOR MODULATOR, RADIO TRANSMITTER MD 203/GR	ea	NX	1		
			CABINET, ELECTRICAL EQUIPMENT: case f/Radio Modulator MD 203/GR; 13 1/4 in lg x 8.187 in w x 7.267 in h o/a; SWED part No. 15P200357 †† L8Ra41B 3 (SEE NOTE PAGE 1)	ea	NX	1		A113
			CAP, ELECTRICAL: cap f/fuseholder; 0.750 in lg x 0.937 in od; Littlefuse part No. 342006 SA2 †† L8Ra41E 2 (SEE NOTE PAGE 1)	ea	X	1		E117
5955-267 4198			CRYSTAL UNIT, QUARTZ: 12 mc; MIL type CR 36/U	ea	X	2		Y101 Y102
5960-188-0987			ELECTRON TUBE: MIL type 26D6	ea	X	2		V101 V105
5960-188-0827			ELECTRON TUBE: MIL type 26A6	ea	X	5		V102 V103 V104 V106 V107
5960-100-7111			ELECTRON TUBE: MIL type 26A7	ea	X	1		V108

(1) FEDERAL OR TECHNICAL SERVICE STOCK NUMBER	(2) REPAIR PARTS SOURCE, MAINTENANCE AND RECOVERABILITY CODE	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATION FIGURE NO.	(9) ILLUSTRATION ITEM NO.
			MD 203/GR (continued)					
5920-280-5039			FUSE, CARTRIDGE: 3AG type, MIL F03G3R00B	ea	X	1		F101
			LAMP, INCANDESCENT: 28 v, T-3-1/4 type bayonet base; MIL Std MS25231 313 †† LARa41E-73 (SEE NOTE PAGE 1)	ea	X	1		I101
			LENS, INDICATOR LIGHT: front panel indicator lens 1/2 in dia, red glass; 27/32 in lg x 5/8 in dia o/a; Johnson EF part No. 23.623-62 †† LARa41E-74 (SEE NOTE PAGE 1)	ea	X	1		E109
			OVEN, CRYSTAL: maintains oven temp 85 deg C, ±2.5 deg C tol; 27.5 v, dc oper pwr; 1.250 in dia x 1.642 in h body dim excl term; Knights part No. JK02C †† LARa41E-79 (SEE NOTE PAGE 1)	ea	NX	2		HR101 HR102
			SHIELD, ELECTRON TUBE: 1-3/4 in lg x 0.828 in dia o/a; SWED part No. 26X202262 †† LARa41E-96 (SEE NOTE PAGE 1)	ea	X	7		E110 E111 thru E116
			RUNNING SPARES AND ACCESSORY ITEMS					
			MODULATOR, RADIO TRANSMITTER MD-203/GR					
5955-267-4198			CRYSTAL UNIT, QUARTZ: 12 mc; MIL type CR-36/U	ea	X	1		Y101 Y102
5960-188-0987			ELECTRON TUBE: MIL type 26D6	ea	X	1		V101 V105
5960-188-0827			ELECTRON TUBE: MIL type 26A6	ea	X	2		V102 V103 V104 V106 V107
5960-100-7111			ELECTRON TUBE: MIL type 26A7	ea	X	1		V108
5920-280-5039			FUSE, CARTRIDGE: 3AG type, MIL F03G3R00B	ea	X	4		F101
			LAMP, INCANDESCENT: 28 v, T-3-1/4 type bayonet base; MIL Std MS25231-313 †† LARa41E-73 (SEE NOTE PAGE 1)	ea	X	1		I101

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

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

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

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Active Army:

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Technical Stf, DA (1) except
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US ARADCOM Rgn (2)
OS Maj Comd (5)
Log Comd (5)
MDW (1)
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Corps (2)
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USATC (2)
Svc Colleges (5)
Br Svc Sch (5) except
USASCS (25)
Gen Depots (2) except
Atlanta Gen Depot (none)
Sig Sec, Gen Depots (10)
Sig Depots (17)
Army Pictorial Cen (2)
Engr Maint Cen (1)
TASSA (15)
Mid-Western Rgn Ofc (TASSA) (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 (2)
Army Terminals (2)
OS Sup Agcy (2)
Yuma Test Sta (2)
USA Elct PG (1)
Sig Lab (5)
Sig Fld Maint Shops (3)
Fld Comd, AFSWP (5)
Mil Dist (1)
Sector Comd, USA Corps (Res) (1)
USA Corps (Res) (1)
JBUSMC (2)
Units org under fol TOE:
11-7 (2)
11-16 (2)
11-57 (2)
11-500 (TM's AA thru AE) (2)
11-557 (2)
11-587 (2)
11-592 (2)
11-597 (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.

U S Govt Printing Office: 1962-368-651