DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL TEST SET, RADIO FREQUENCY POWER AN/USM-161

Headquarter's, Department of the Army, Washington 25, D. C.
15 May 1962

WARNING

Be careful when working on the 115-volt ac line connections. Serious injury or death may result from oontact with these terminals.

DON'T TAKE CHANCES!

This copy is a reprint which includes current pages from Changes 2, 3, and 4.

TM 11-6625-498-12
C 3

CHANGE
NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *14 February 1974*

Operator and Organizational Maintenance Manual
TEST SET, RADIO FREQUENCY POWER AN/USM-161

TM 11-6625-498-12, 15 May 1962, is changed as follows:

Page 5, paragraph 2. Delete paragraph 2 and substitute:

2. Indexes of Publications

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

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

Paragraph 2.1. Delete paragraph 2.1 and substitute:

2.1. 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) MCO P4030.29 (Marine Corps),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 (Army)/NAVSUP INST 4610.33/AFM 75-18/MCO P4610.19A (Marine Corps), and DSAR 4500.15.

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

Page 6, paragraph 5. Delete paragraph 5 and substitute:

5. Items Comprising the Operable Frequency Power AN/USM-161

FSV	*QTY*	*Nomenclature*
6625-892-5541		Test Set, Radio Frequency Power AN/USM-161 consisting of:
		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.
5905-856-8854	1	Attenuator, Fixed CN-844/USM-161
5905-856-8855	2	Attenuator, Fixed CN-845/USM-161
6625-856-9117	1	Bolometer, Radio Frequency DT-225/USM-161
5995-889-0815	1	Cable Assembly, Radio Frequency CG-2514/U: (6 ft)

FSN	QTY	Nomenclature
6625-892-5540	1	Test Set, Radio Frequency Power TS-1776/USM-161: provides power range from 0 to 10 mw when attenuators are added: 12 in. lg x 14 in. wd x 10 in. h

Page 32, appendix III. Delete appendix III and substitute:

APPENDIX III
BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items required by the crew/operator for installation, operation, and maintenance of Test Set, Radio Frequency Power AN/USM-161.

2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. Basic Issue Items List–Section II. A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

b. Items Troop Installed or Authorized List–Section III. Not applicable.

3. Explanation of Columns.

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

a. Illustration. Not applicable.

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

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

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

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

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

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

SECTION II. BASIC ISSUE ITEMS LIST

(1) Illustration		(2) Federal stock number	(3) Part number	(4) FSCM	(5) Description Usable on code	(6) Unit of meas	(7) Qty furn with equip
(A) Fig. no.	(B) Item no.						
		6625-857-5301	1623	11332	COVER, TEST SET CASE, ALUM 2 HINGES, 2 LATCHES, 14 IN. LG X 10 IN. WD X 2.81 IN. D O/A, SHEET 2 (MOUNTED IN EQUIP).	EA	1

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

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ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMDS (3)
MICOM (2)
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Armies (2)
Corps (2)
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Svc Colleges (1)
USASESS (5)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAINTS (3)
WRAMC (1)
USACDCEC (10)
ATS (1)
Instl (2) except
Fort Gordon (10)
Fort Huachuca (10)
Fort Carson (5)
Ft Richardson (ECOM Ofc) (2)
WSMR (1)
Army Dep (2) except
LBAD (14)
SAAD (30)
TOAD(14)
ATAD (10)
USA Dep (2)
Sig Sec USA Dep (2)
Sig Dep (2)
Sig FLDMS (1)
USAERDAA (1)
USAERDAW (1)
MAAG (1)
USARMIS (1)
Units org under fol TOE:
(1 copy each)
11-16
11-97
11-98
11-117
11-158
11-500 AA-AC
29-134
29-136

NG: State AG (3)
USAR: None
For explanation of abbreviations used, see AR 310-50.

TECHNICAL MANUAL
OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
TEST SET, RADIO FREQUENCY POWER AN/USM–161

TM 11–6625–498–12
CHANGES No. 2

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D.C., *6 June 1963*

TM 11–6625–498–12, 15 May 1962, is changed as follows:

Note. The parenthetical reference to previous changes (example: "page 3 of C 1") indicates that pertinent material was published in that changes.

Page 5. Delete paragraph 2 and substitute:

2. 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 your equipment. DA Pam 310–4 is an index of current technical manuals, technical bulletins, 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.

Add paragraph 2.1 after paragraph 2.

2.1. 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. Comments on Manual. Forward all comments on this publication direct to: Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS–MP, Fort Monmouth, N.J. (DA Form 1598 (Record of Comments on Publications), DA Form 2496 (Disposition Form), or letter may be used.)

Page 6, paragraph 8. Make the following changes:

Add the following to subparagraph *a*: The 7-db attenuator can withstand the application of 5 watts of RF power.

Add the following to subparagraph *b*: Each 10-db attenuator can withstand the application of 1 watt of RF power.

Page 7, paragraph 13. Add the following caution after subparagraph *b*:

Caution: **When measuring 1 to 5 watts of RF power, be sure to connect the 7-db attenuator closest to the RF source.**

Page 14, paragraph 20*d*, chart, "Position" column, second item. Change "0 ⌐‾¬" to: 0.

Page 16, paragraph 23*e*. Add the following caution after subparagraph (1):

Caution: **When measuring 1 to 5 watts of RF power, be sure to connect the 7-db attenuator closest to the RF source. The 7-db attenuator is the only attenuator that can withstand the application of 5 watts of RF power.**

Page 18. Delete paragraphs 24, 25, and 26 and substitute:

24. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the test set are listed below, together

with a reference to the paragraphs covering the specific maintenance functions. The duties assigned do not require tools or test equipment other than those issued with the equipment.

a. Daily preventive maintenance checks and services (par. 26).

b. Weekly preventive maintenance checks and services (par. 26.1).

c. Cleaning (par. 26.2).

d. Operational checklist (par. 27).

e. Repairs and adjustments (par. 28).

25. Operator's Maintenance

Operator's 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 26, 26.1 and 26.2 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. 26 and 26.1) outline functions to be performed at specific intervals. These checks and services are designed to maintain Army 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 paragraphs that contain detailed repair or replacement procedures. 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 TM 38-750.

26. Daily Preventive Maintenance Checks and Services

Sequence No.	Item	Procedure	References
1	Test Set	Check equipment for completeness and general condition.	Appx III.
2	Exterior surfaces	Clean exterior surfaces of the equipment.	Par. 26.2.
3	External receptacles	Inspect external receptacles for breakage and for firm seating.	
4	Glass	Inspect front-panel glass windows, for damaged housing, broken glass, physical damage, dust, or moisture.	
5	Knobs, controls, and switches.	During operation (item 6), check knobs, controls, and switches for proper mechanical action. Action must be positive, without backlash, binding, or scraping.	
6	Operation	Perform the procedures listed in the operational checklist (par. 27).	Par. 27.

Add paragraphs 26.1 and 26.2 after paragraph 26.

26.1. Weekly Preventive Maintenance Checks and Services

Sequence No.	Item	Procedure	References
1	Cables	Inspect external cables for cuts, cracked or gouged jackets, fraying, or kinks.	
2	Hardware	Inspect all exterior hardware for looseness and damage. The test set cover, carrying handle, hinges, and all bolts, and screws must be tight and not damaged.	
3	Preservation	Inspect the equipment to determine that it is free of bare spots, rust, and corrosion. If these conditions exist, refer to higher echelon for repair.	

26.2. Cleaning

Inspect the exterior of the test set. The exterior surface should be clean, and free of dust, dirt, grease, and fungus.

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

Warning: **Cleaning compound in 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, (Fed. stock No. 7030–395–9542).

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

Caution: **Do not press on the meter face (glass) when cleaning; the meter may become damaged.**

d. Clean the front panels, meters, and control knobs; use a soft clean cloth. If necessary dampen the cloth with water; mild soap may be used for more effective cleaning.

Page 19. Delete figure 7.

Page 20. Delete figure 8.

Page 21. Delete paragraphs 29 and 30 and substitute:

29. Scope of Second Echelon Maintenance

The maintenance duties assigned to the organizational maintenance repairman of the test set are listed below, together with a reference to the paragraphs covering the specific functions. The duties assigned do not require tools or test equipment other than those issued with the equipment.

a. Monthly preventive maintenance checks and services (par. 31).

b. Rustproofing and painting (par. 32).

c. Equipment performance checklist (par. 33).

d. Second echelon repairs and adjustments (par. 34).

30. Monthly Maintenance

Perform the maintenance functions indicated in the monthly preventive maintenance checks and services chart (par. 31) once each month. A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a standby (ready for immediate operation) condition must have monthly preventive maintenance checks and services performed on it. Equipment in limited storage (requires service before operation) does not require monthly preventive maintenance.

Page 22. Delete paragraphs 31 and 32 and substitute:

31. Monthly Preventive Maintenance Checks and Services

Sequence No.	Item	Procedure	References
1	Publications	Inspect the manual for completeness and to see if it is in usable condition, without missing pages. Be sure that all Changes to the manual are on hand.	DA Pam 310–4.
2	Modification work orders	Check to see that all urgent MWO's have been applied and that all routine MWO's have been scheduled.	DA Pam 310–4.
3	Completeness	Check the equipment for completeness and general condition.	Appx III.
4	Cleanliness	Clean the exterior surfaces of the equipment.	Par. 26.2.
5	Preservation	Inspect the equipment to determine that it is free of bare spots, rust, and corrosion.	Par. 32.
6	External receptacles	Inspect the external receptacles for breakage and for firm seating.	
7	Glass	Inspect the front-panel glass windows for damaged housing, broken glass, physical damage, dust, or moisture.	
8	Cables	Inspect the external cables for cuts, cracked or gouged jackets, fraying, or kinks.	
9	Hardware	Inspect all exterior and interior hardware for looseness and damage. The test set cover, carrying handle, hinges, and all bolts and screws must be tight and not damaged.	
10	Resistors, capacitors, bushings, and insulators.	Check resistors, capacitors, bushings, and insulators for cracks, chipping, blistering, moisture, and discoloration.	
11	Case interior	Check interior of case for moisture due to condensation.	
12	Knobs, controls, and switches	During operation (item 13), observe that the mechanical action of each knob, control, and switch is smooth and free of external or internal binding.	
13	Performance	Perform the procedures listed in the equipment performance checklist (par. 33).	Par. 33.

32. Rustproofing and Painting

a. Rustproofing. When the finish on the tester has become badly scarred or damaged, rust and corrosion can be prevented by touching up the bare surfaces. Use No. 000 sandpaper to clean the surface down to the bare metal. Obtain a bright, smooth finish.

b. Painting. Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to the applicable cleaning and refinishing practices specified in TM 9–213.

Page 23. Delete figure 9.

Page 26. Add the following references to appendix I.

TM 9–213 Painting Instructions for Field Use.

TM 38–750 The Army Equipment Record System and Procedures.

Page 29, appendix II (page 3 of C 1). Delete section II and substitute:

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
TEST SET, RADIO FREQUENCY POWER: AN/USM-161	service	x						
	adjust				x		8	
	inspect	x						
	test				x		8, 11, 17	Tests limited by authorization of test equipments.
						x	1 thru 14, 18	
	repair	x					19	Limited to replacement of running spares, pluck-out items, knobs, except calibrated knobs.
					x		15, 16	
	align					x	1 thru 14, 18	
	overhaul					x	15, 16	
BOLOMETER, RADIO FREQUENCY: DT-255/USM-161	replace	x						
	repair					x	15, 16	
TEST SET, RADIO FREQUENCY POWER: TS-1776/USM-161	repair	x					19	Limited to replacement of running spares, pluck-out items, knobs, except calibrated knobs.
					x		15, 16	
						x	15, 16	

Page 31, appendix II (page 4 of C 1). Delete section III and substitute:

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
AN/USM-161 (continued)							
AUDIO LEVEL INDICATOR: WEINSCEL, MODEL 1N1					†	1	
ATTENUATOR: WEINSCEL, MODEL CF-1					†	2	
BOLOMETER: WEINSCEL, MODEL BA-1B					†	3	
BOLOMETER: GMC 408 W/MOUNT GMC-401					†	4	
COAXIAL SLOTTED HUE: IM-92/U					†	5	
DOUBLE STUD TUNER: NARDA NO. 903N					†	6	
INDICATOR, STANDING WAVE: IM-97/USM-37					†	7	
MULTIMETER: ME-26/U				†	†	8	
OSCILLOSCOPE: AN/USM-81					†	9	
PREAMPLIFIER: AM-3148/USM					†	10	
SIGNAL GENERATOR: SG-104/MRQ-7				†	†	11	
SIGNAL GENERATOR: AN/URM-61					†	12	
SIGNAL GENERATOR: AN/URM-52A					†	13	
TEST SET, ELECTRON TUBE: TV-2/U					†	14	
TOOL KIT, RADAR AND RADIO REPAIRMAN TK-87/U				†	†	15	
TOOL KIT, RADAR AND RADIO REPAIRMAN TK-88/U				†	†	16	
TUBE TESTER: TV-7/U				†		17	
VOLTMETER, ELECTRONIC: AN/USM-98					†	18	
TOOLS AND TEST EQUIPMENTS NORMALLY AVAILABLE TO REPAIRMAN USER BECAUSE OF HIS ASSIGNED MISSION.	†					19	

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.

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Sig Dep (OS) (12)
Sig Sec, GENDEP (5)
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  Sacramento (28)
  Tobyhanna (12)
USA Elct RD Actv, White Sands (13)
USA Elct RD Actv, Ft Huachuca (2)
USA Trans Tml Comd (1)
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  11-500 (AA-AC) (4)
  11-557
  11-587
  11-592
  11-597

NG: State AG (3).

USAR: None.

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

TM 11-6625-498-12
*C 4

CHANGE
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *25 October 1977*

Operator's and Organizational Maintenance Manual TEST SET, RADIO FREQUENCY POWER AN/USM-161 (NSN 6625-00-892-5541) AND AN/USM-161A (NSN 6625-00-892-5541)

TM 11-6625-498-12, 15 May 1962, is changed as follows:
The title of this manual is changed as shown above.

Page 5. Paragraph 1.1 is added after paragraph 1.

1.1. Index 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.

Page 5. Paragraphs 2, 21 and 22 are superseded as follows:

2. Forms and Records

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

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610. 33A/ ARF 75-18/MCO P4610.19B and DSAR 4500.15

2.1. Reporting Errors

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

2.2. Reporting Equipment Improvement Recommendations (EIR)

EIR 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 direct to you.

2.3. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

***Supersedes change 1, 28 November 1962.**

2.4. Destruction of Army Electronic Materiel

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

Page 6. **Paragraph 5 is superseded as follows:**

5. Items Comprising an Operable Test Set, Radio Frequency Power AN/USM-161 and AN/USM-161A

a. Items comprising an operable equipment are listed below:

Quantity	National Stock No.	Nomenclature	Dimensions		
			Height	Depth	Width
1	6625-00-892-5541	Test Set, Radio Frequency Power AN/USM-161 consisting of:	10	12	14
1		Test Set, Radio Frequency Power TS-1776/USM-161	10	12	14
1		Bolometer, Radio Frequency DT-255/USM-161	4.56		2 (dia)
1	5905-00-856-8854	Attenuator, Fixed CN-844/USM-161	8.281		0.812 (dia)
1	5905-00-856-8855	Attenuator, Fixed CN-845/USM-161	8.281		0.812 (dia)
1		Cable Assembly, Radio Frequency CG-2514/U	6 ft		
		OR			
1	6625-00-892-5541	Test Set, Radio Frequency Power AN/USM-161A consisting of:	14	15	11
1		Test Set, Radio Frequency Power TS-1776A/USM-161	14	15	11
1		Bolometer, Radio Frequency DT-255A/USM-161	5		2 (dia)
		OR			
1		Bolometer, Radio Frequency DT-255B/USM-161 USM-161	3-3/16		2 (dia)
1		Attenuator, Fixed CN-844A/USM-161	8.25		0.750 (dia)
1		Attenuator, Fixed CN-845A/USM-161	8.25		0.750 (dia)
1		Cable Assembly CG-460D/U	6 ft		
		OR			
1		Cable Assembly CG-2514/USM-161	6 ft		

Page 26. Appendix I is superseded as follows:

APPENDIX I
REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (type 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-6825-200-15	Operator's, Organizational, DS, GS, and Depot Maintenance Manual: Multimeter ME-26A/U, ME-26B/U, ME-26C/U, and ME-26D/U.
TM 11-6825-214-10	Operator's Manual Signal Generator AN/URM-52 and AN/URM-52A.
TM 11-6625-274-12	Operator's and Organizational Maintenance Manual Test Sets, Electron Tube TV-7/U, TV-7A/U, TV-7B/U, and TV-7D/U.
TM 11-6625-280-15	Organizational, Field and Depot Maintenance Manual Signal Generators AN/URM-49, AN/URM-49A, AN/URM-49B, and AN/URM-49C.
TM 11-6625-316-12	Operator and Organizational Maintenance Manual Test Sets, Electron Tube TV-2/U, TV-2A/U, TV-2B/U and TV-2C/U.
TM 11-6625-455-10	Operator's Manual Power Supply PP-962/U.
TM 11-6626-2745-14	Operator, Organizational, DS and GS Maintenance Manual Voltmeter, Electronic ME-30F/U.
TM 38-750	The Army Maintenance Management Systems (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

Appendix II is superseded as follows:

APPENDIX II
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General.

This appendix provides a summary of the maintenance operations for Test Set, Radio Frequency Power AN/USM-161 and AN/USM-161A. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Function.

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper-operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

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

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

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

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

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those service/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc) considered in classifying Army equipment component

C-3. Column Entries

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

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, as-

semblies, subassemblies, and modules for which maintenance is authorized.

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

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

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

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

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

C.4 Tool and Test Equipment Requirements (Sec. III)

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

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

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

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

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

C-5. Remarks (See IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

Appendix III is rescinded.

SECTION II, MAINTENANCE ALLOCATION CHART

FOR

AN/USN-161 AND AN/USN-161A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
01	TEST SETS AN/USN-161 AND AN/USN-161A	Service		0.5		1.0			
		Adjust				1.0		7,8,10	
		Inspect				1.0		6	
		Test				2.0		1 thru 5 7 thru 1	
		Replace		0.5		1.0		10	
		Repair		0.2		2.0		10	
		Overhaul					2.0	1 thru 5 7 thru 18	

SECTION III. TOOL AND TEST EQUI PMENT REQUIREMENTS
FOR
AN/USM-161 AND AN/USM-161A

OL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1		INDICATOR , STANDING WAVE RATIO AN/USM-37	6625-814-8357	
2		SIGNAL GENERATOR AN/URM-49	6625-669-5131	
3		SIGNAL GENERATOR AN/URM-61	6625-519-2056	
4		SIGNAL GENERATOR AN/URM-52A	6625-965-1501	
5		TEST SET, ELECTRON TUBE TV-2/0	6625-699-0263	
6		TEST SET, ELECTRON TUBE TV-7/0	6625 -820-0064	
7		MULTIMETER , ME-26 B/U	6625 -360-2493	
8		VOLTMETER , ELECTRONIC ME-30B/U	6625-669-0742	
9		TEST SET , RF POWER TS-125/AP	6625-229-1038	
10		TOOL KIT TK-100/U	5180-605-0079	
11		AUDIO LEVEL INDICATOR WEINSCHEL MODEL 1M1		
12		ATTENUATOR WEINSCHEL MODEL CF-1		
13		BOLOMETER , WEINSCHEL MODEL BA-18		
14		BOLOMETER PRO # 610A^{W}/FXR MOUNT N200A		
15		COAXIAL SLOTTED UNIT IM-92/U	6625- 356-0314	
16		DOUBLE STUD TUNER NARDA MODEL 903N		
17		POWER SUPPLY PP-962/U	6625-756-1800	
18		PAD 30DB		
19		TOOLS & TEST EQUIPMENT NORMALLY AVAILABLE TO USER BECAUSE OF ASSIGNED MISSION		

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	REPAIR BY REPLACEMENT-KNOBS, FUSES. TUBES, SHIELDS , CABLE ASSEMBLY, AND LAMPS.

By Order of the Secretary of the Army:

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

Official:

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

Distribution:
Active Army:
USASA (2)
COE (1)
USAARENBD (1)
DARCOM (1)
TECOM (2)
USACC (4)
TRADOC (2)
OS Maj Comd (4)
MDW (1)
Armies (2)
Corps (2)
Ft Gillem (10)
Ft Gordon (10)
Ft Huachuca (10)
Ft Carson (5)
HISA (Ft Monmouth) (33)
Ft Richardson (ECOM Ofc) (2)
Svc Colleges (1)
USAICS (3)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
AD (1) except
SAAD (30)
LBAD (14)
TOAD (14)
SHAD (3)
USA Dep (2)
Sig Sec USA Dep (2)
Sig Dep (2)
MAAG (l)
USARMIS (1)
USAERDAA (1)
USAERDAW (1)
Sig FLDMS (Less Europe) (1)
Units org under fol TOE: 1 ea.
11-16
11-97
11-98
11-117
11-500(AA-AC)
29-134
29-136

ARNG: State AG (3); Units - Same as Active Army except allowance is one (1) copy per unit.
USAR: None.
For explanation of abbreviations used, see AR 310-50.

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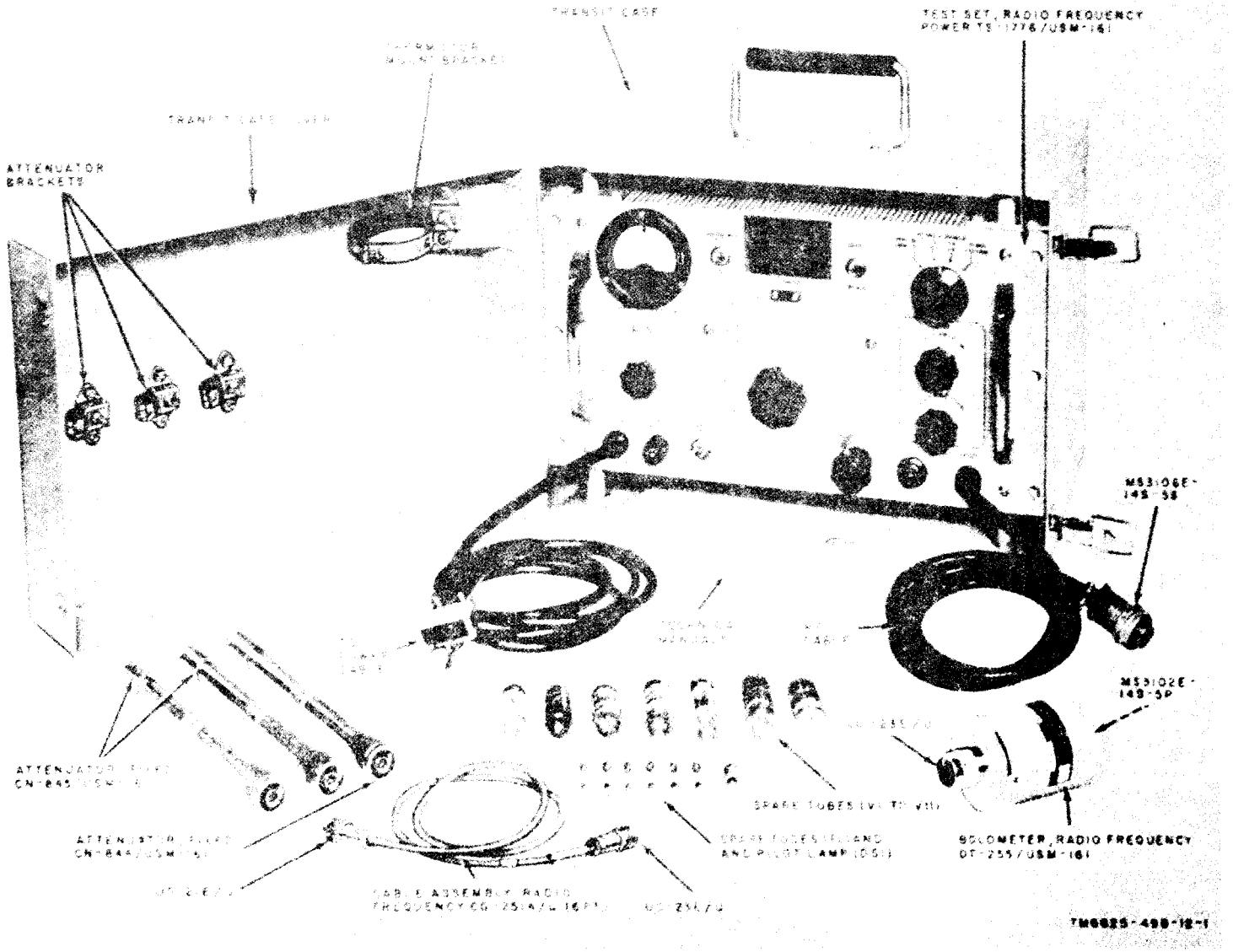


Figure 1. Test Set, Radio Frequency Power AN/USM-161.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

This manual describes Test Set, Radio Frequency Power AN/USM-161 and covers its operation and the operator's and organizational maintenance. It includes replacement of parts available to first and second echelon and instructions for cleaning and inspection of the equipment.

2. Forms and Records

a. Unsatisfictory Equipment Report. Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) as specified in AR 700-39.

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 Forms. Prepare DA Form 11-266 (fig. 7, 8, and 9) (Maintenance Check List for Signal Equipment (Test Equipment)) 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 Manual 7, 8, or 9), direct to the Commanding Officer, U. S. Army Signal Materiel Support Agency, ATTN: SIGMS-ML, Fort Monmouth, N. J. to recommend changes in, or to comment on, Basic Issue Items Lists or Repair Parts and Special Tools Lists .

e. Changes or Revisions. Refer to DA Pamphlet 31-4 to determine what Changes to, or revisions of, this manual are current.

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

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Test Set, Radio Frequency Power AN/USM-161 (fig. 1), is an alternating-current (at) operated, temperature-compensated, portable test unit used to measure radio frequency (rf) power output ranging from 10 megacycles (mc) to 10,000 mc from either continuous-wave (cw), modulated, or pulsed sources. It is designed to measure rf power from 2 microwatts (uw) to 10 milliwatts (mw). With the use of the external attenuators supplied, the AN/USM-161 can be used to measure rf power up to 5 watts.

b. Measurements are accurate within ±2 per cent of full-scale indication in all ranges.

4. Technical Characteristics

Rf input power range	.2 uw to 5 watts.
Frequency range	.10 mc to 10,000 mc without external attenuators; 1,000 mc to 10,000 mc with external attenuators.
Accuracy	.4 percent of full-scale indication.
Thermal drift	Less than 10 uw/° C.
Scale resolution	Approximately 0.2 percent of full-scale indication.

Temperature range. . -20° C(-4°F) to +55° C (+131°F).
Weight . . . . . 29 pounds.
Number of electron tubes . . . . . 11.
Input power . . . . . 115 volts ±11.5, 50 to 1,000 cycles per second.
Power consumption. . 55 watts.

5. Table of Components
(fig. 1)

The components of the AN/USM-161 are listed in the basic issue items list (appx III) .

6. Nomenclature and Common Names

Nomenclature	Common name
Test Set, Radio Frequency Power AN/USM-161.	Test Set.
Test Set, Radio Frequency Power TS-1776/USM-161.	Power meter.
Attenuator, Fixed CN-844/USM-161	7-db attenuator.
Attenuator, Fixed CN-845/USM-161	10-db attenuator.
Bolometer, Radio Frequency DT-255/USM-161.	Thermistor mount..
Cable Assembly, Radio Frequency CG-2514/U (6 ft) .	Rf cord.

7. Description of Test Set
(fig. 1)

a. The test set consists of a single unit mounted in a transit case equipped with carrying handle. All operating controls and indicators of the power meter are mounted on the front panel for ease of operation. The power meter is completely self-contained and portable.

b. Two cables (rf and ac power) are supplied to provide operating power input and thermistor mount connections. Neither cable is removable. A third cable (rf cord) is used to connect the equipment under test to the power meter. The three attenuators and the thermistor mount are clamped within the inside cover of the transit case. The transit case also provides room for the technical manuals and running spares.

c. Captive bolts on the front panel of the power meter permit withdrawal of the power meter from the transit case for servicing. The cover can be removed from the transit case.

8. Description of Minor Components
(fig. 1)

a. Attenuator, Fixed CN-844/USM-161. One 7-decible (db) attenuator is supplied with the test set and provides 7 db of attenuation to increase the power range of the power meter. The 7-db attenuator has one end threaded to mate with Connector, Plug, Electrical UG-21E/U and the other end terminated in Connector, Plug, Electrical UG-23E/U, and can be connected with the 10-db attenuators to provide varying amounts of attenuation. The 7-db attenuator interconnects the equipment under test (or the rf cord) and the thermistor mount. The frequency response of the 7-db attenuator is from 1,000 to 10,000 mc.

b. Attenuator, Fixed CN-845/USM-161. Two of these 10-db attenuators are supplied with the test set. Each provides 10 db of attenuation to increase the power range of the power meter. Each 10-db attenuator has one end threaded to mate with a UG-21E/U connector and the other end terminated in UG-23E/U connector. They can be connected in tandem or with the 7-db attenuator to provide varying amounts of attenuation. The 10-db attenuators interconnect the equipment under test (or the rf cord) and the thermistor mount. The frequency response of the 10-db attenuators is from 1,000 to 10,000 mc.

c. Bolometer, Radio Frequency DT-255/USM-161. The thermistor mount is a dustproof housing in which two thermistors are mounted. One end (connector type MS-3102E-14S-5P) of the thermistor mount mates with the rf cable connector (type MS3106E-14S-5S). The frequency response of the thermistor mount is from 10 to 10,000 mc.

d. Cable Assembly, Radio Frequency CG-2514/U (6 ft). This rf cord consists of a length of Cable, Radio Frequency RG-214/U terminated at one end with a UG-21 E/U connector and at the other end with a UG-23E/U connector. The rf cord is used to connect the equipment under test to the power meter.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

9. Unpacking

(fig. 2)

a. Packaging Data. When packed for shipment the test set is packed in two cardboard cartons, and a V-board shipping carton. A typical shipping carton and its contents are shown in figure 2. The dimensions of the V-board shipping carton are 14-1/2 by 11-1/2 by 11-1/2 inches, the volume 1.177 cubic feet, and the weight is 29 pounds.

b. Removing Contents.

(1) Cut the waterproof tape that seals the top of the V-board shipping

(2) Remove the enclosed cardboard carton.

(3) Cut the waterproof tape that seals the top of the cardboard carton.

(4) Open the moisture-vaporproof barrier in the cardboard container.

(5) Remove the enclosed cardboard carton.

(6) Cut the waterproof tape that seals the top of the cardboard carton.

(7) Remove the humidity indicator, the desiccant, and the pads.

(8) Remove the test set.

10. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, refer to paragraph 2.

b. Check the equipment against the packing list. When no packing list accompanies the equipment, use the table of components (para 5) as a general check.

11. Installation

All tubes, the fuse, and the power indicator lamp are installed in the power meter when the equipment is shipped. Locations of the tubes are shown in figure 3. The fuse and the power indicator lamp are on the front panel. No installation procedures are necessary.

12. Preparation for Use

(fig. 1)

a. Open the two spring-loaded transit case cover latches.

b. Slide the transit case cover up and off the loose-joint hinges.

c. Remove the attenuators, rf cord, and thermistor mount from their storage positions.

13. Thermistor Mount, Rf Cord, and Attenuator Installation

a. Thermistor Mount. Install the thermistor mount by attaching connector MS3102E-14S-5P to connector MS3106E-14S-5S (fig. 1). The attachment of connector UG-23E/U (on the thermistor mount) will be determined by application of rf input power to be measured.

b. Rf Cord. Install the rf cord if the rf input power equipment to be measured is more than 4 feet from the power meter by attaching connector UG-23E/U to the equipment under test and connector UG-2lE/U to the attenuator or themistor mount as applicable.

c. Attenuators. Install the attenuators as applicable for the rf input power to be measured.

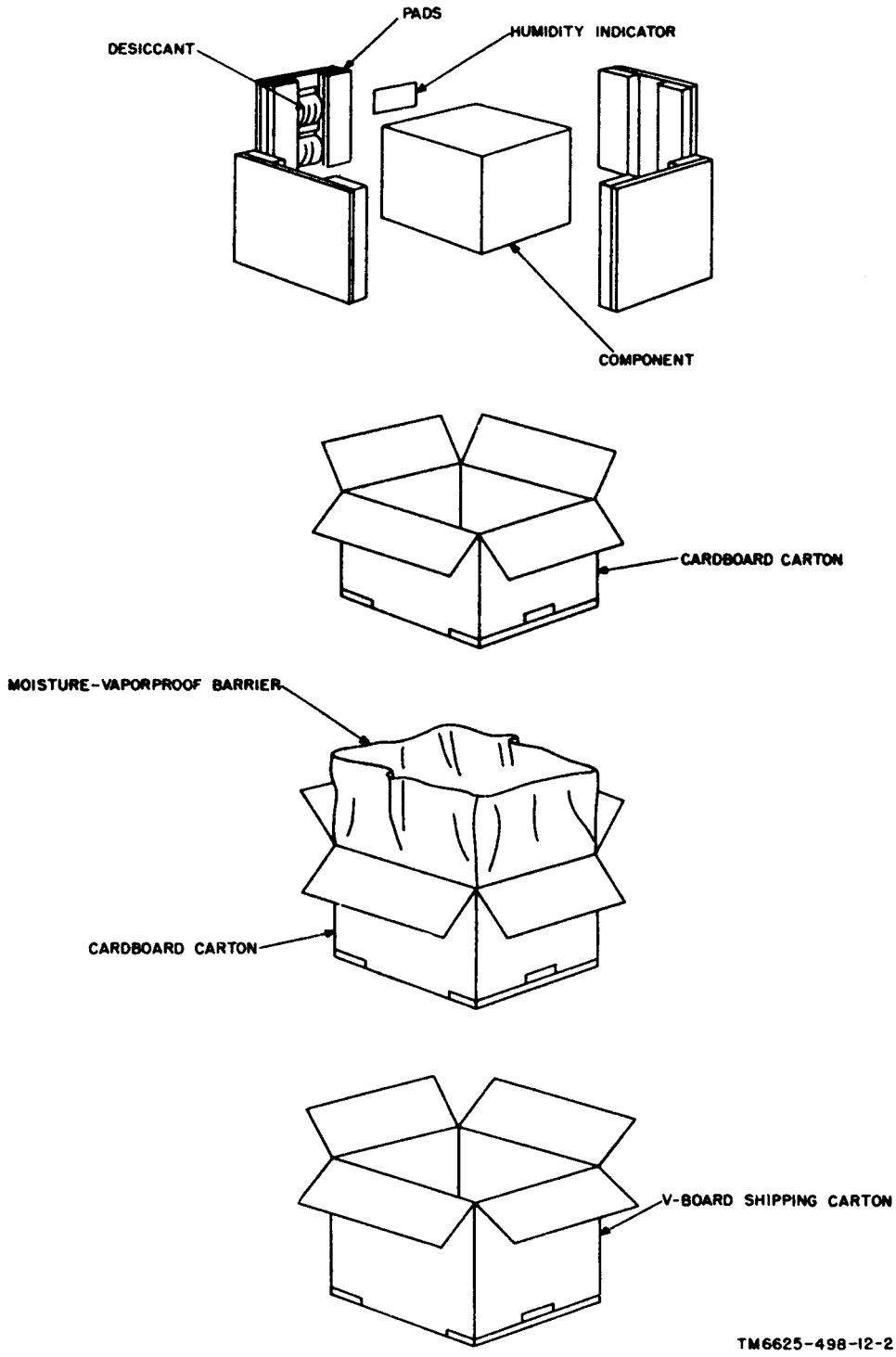


Figure 2. Typical packaging.

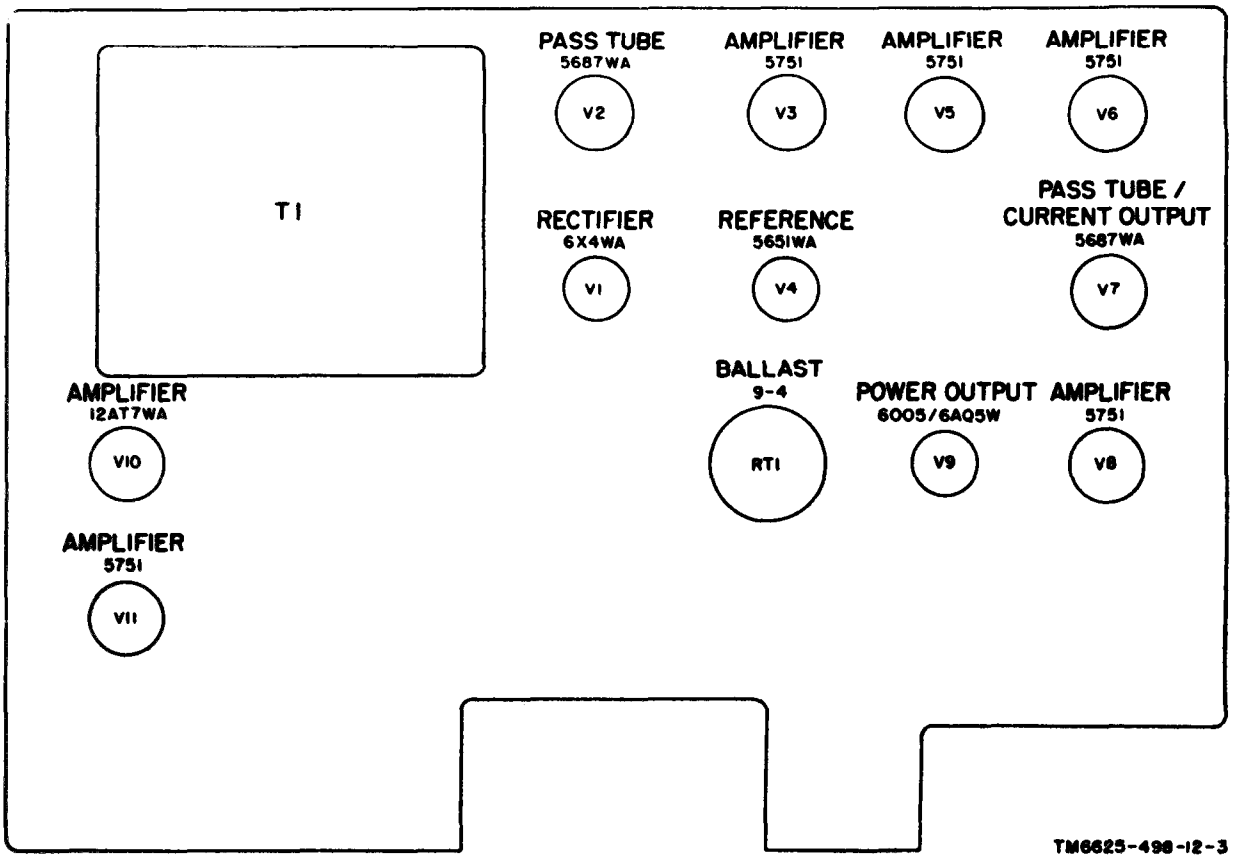


Figure 3. Test Set, Radio Frequency Power TS-1776/USM-161, tube locations.

Section II. CONTROLS AND INDICATORS

14. Operator's Controls and Indicators (fig.4)

The following chart lists the controls and indicators of the power meter and indicates their functions:

Control or indicator	Function
LINE ON ----------	In ON position, turns on the power meter. In off (down) position, removes power from power meter.
COMP ATTENUATOR----------	Compensates for deviations from the nominal value of the attenuators.
NULL INDICATOR meter----------	Indicates balance of the rf power bridge circufts.
THERM RES (2-position toggle switch) ---	*Sw pos* — *Action* 200 Ω — Selects proper attenuation when thermistor mount is used. 100 Ω — Selects proper attenuation when a 100-ohm thermistor mount is used.
POWER----------	When BIAS-READ switch is in the READ position, adjusts the NULL INDICATOR meter to compensate for the rf power under test.
BIAS-READ (2-position toggle switch)--------	*Sw pos* — *Action* BIAS — Permits the use of the BIAS COARSE-FINE controls for rapid zeroing (null indication) of the NULL INDICATOR meter.

Control or indicator	Function		
	Sw pos		*Action*
POWER RANGE (4-position rotary switch) (the multiplication factor for each of the switch positions is given in paragraph 19).	READ		permits the use of the POWER control to measure rf power under test.
	.30 -5	MW DBM	Permits the use of the center and innermost scales of the POWER control for reading the rf power under test.
	1.0 0	MW DBM	Permits the use of the outermost and innermost scales of the POWER control for reading the rf power under test.
	3.0 +5	MW DBM	Permits the use of the center and innermost scales of the POWER control for reading the rf power under test.
	10 +10	MW DBM	Permits the use of the outermost and innermost scales of the POWER control for reading the rf power under test.
BIAS:			
COARSE----------	When BIAS-READ switch is in BIAS position, provides coarse adjustment for a null indication on the NULL INDICATOR meter.		
FINE----------	When BIAS- READ switch is in the BIAS position, provides fine adjustment for a null indication on the NULL INDICATOR meter.		
Power indicator lamp---------- ----------	Lights when ac power is applied to the power meter.		

15. Connecting Facilities

The cables and cord for the power meter and test connections (fig. 1) are listed below.

Facility	Function
Ac power cable ---------- ----------	Connects the power meter to 115-volt 50- to 1,000-cps ac power receptacle
Rf cable--------- ---------- --------	Connects thermistor mount to power meter bridge.
Rf cord---------- ---------- --------	Connects equipment under test to attenuators or to the thermistor mount.

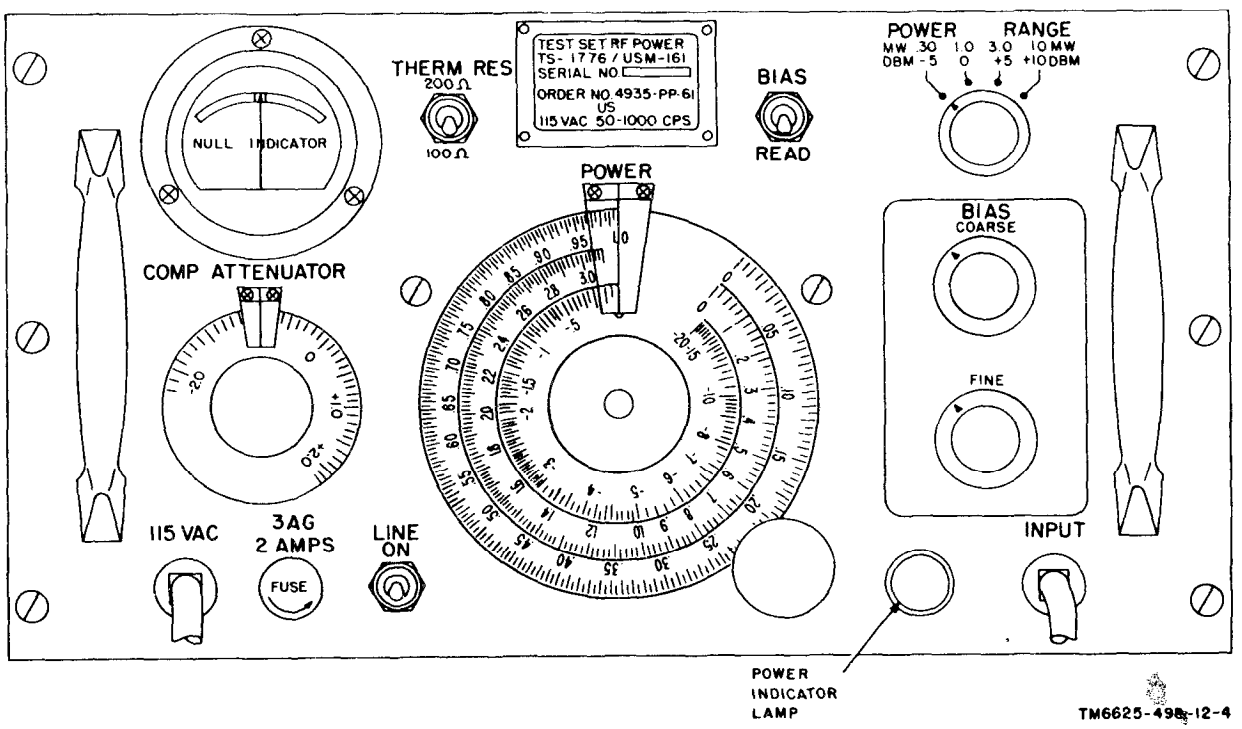


Figure 4. Test Set, Radio Frequency Power TS-1776/USM-161, operating controls.

Section III. OPERATION

16. Use. of 7- and 10-Db Attenuators Calibration Plates (fig. 5)

Note: The frequency of tbe rf input power to be measured is always known to the operator of the power meter.

Calibration data giving the actual attenuation values of the attenuators and deviation from nominal attenuation of five frequencies are given on the calibration plate attached to each attenuator. Temperature variations do not effect the attenuators, if they do not exceed the maximum temperature limitations (-20°C (-4° F) to +55° C (+131°F)). The correction factor for each attenuator is indicated by five holes punched in this plate to represent this correction factor. To determine the correction factor for any attenuator, refer to figure 5 and perform the instructions in *a* through *e* below.

a. Visualize a line between the five holes punched in the calibration plate.

b. Visualize a horizontal line corresponding to the frequency of the rf power under test. (The horizontal lines on the calibration plate represent frequency in kilomegacycles (kmc).)

c. Visualize a vertical line from the point where the horizontal line intersects the line between the five punched holes. The intersection of this vertical line with the horizontal axis is the correction factor.

d. As an example, assume the five punched holes on the calibration plate were at +1.6 db at 1 kmc, -0.1 db at 3 kmc, -0.7 db at 5 kmc, -1.2 db at 7 kmc, and -1.8 db at 10 kmc as shown on figure 5. The correction factor at 4 kmc would be -0.48 db. Similarly, the correction factor at 6 kmc would be -1 db.

e. Repeat the instructions in *a, b,* and *c* above for each of the attenuators used.

f. Algebraically, add the correction factors; observe the positive and negative signs.

g. Set the COMP ATTENUATOR control to the sum determined in *f* above only if between -2.2 and +2.2 db.

h. If the sum determined in *f* above is less than -2.2 db or more than +2.2 db, set the COMP ATTENUATOR control to 0. This sum (less than -2.2 db or more than +2.2 db) will be added algebraically to the reading on the innermost scale in db of the POWER control when measuring rf input power.

17. Use of Thermistor Mount and Attenuators

Caution: Never exceed the maximum permissible rf power input to the power meter. Failure to observe this precaution may result in damage to the equipment.

The maximum rf power input is 10 mw for the 200-ohm thermistor mount (supplied). The attenuators reduce the rf power input to the thermistor mount by a fixed percentage so that higher rf power maybe applied to the power meter without exceeding the maximum rf power rating of the thermistor mount used. One 7-db and two 10-db attenuators are supplied: Attenuator, Fixed CN-844/USM-161 (7-db) and Attenuator, Fixed CN-845/USM-161 (10-db). Several combinations for series connection of these attenuators can be made, as these attenuators are additive algebraically. The maximum permissible rf power input for various combinations of attenuators used with the thermistor mount is given below:

Attenuator total (db)	Maximum rf source power	Maximum pulse peak power (kw)
None	10 mw	1
10	100 mw	1
20	1 watt	1
27	5 watts	5

18. Use of Rf Cord

When the distance from the power meter to the equipment under test is greater than approximately 4 feet, an rf cord is provided. This rf cord attaches to the thermistor mount (or attenuators, if required) and connects to the equipment under test. The use of the rf cord requires the insertion of a correction factor and is indicated on a calibration plate attached to the rf cord. The rf cord calibration plate standard correction factor is as follows:

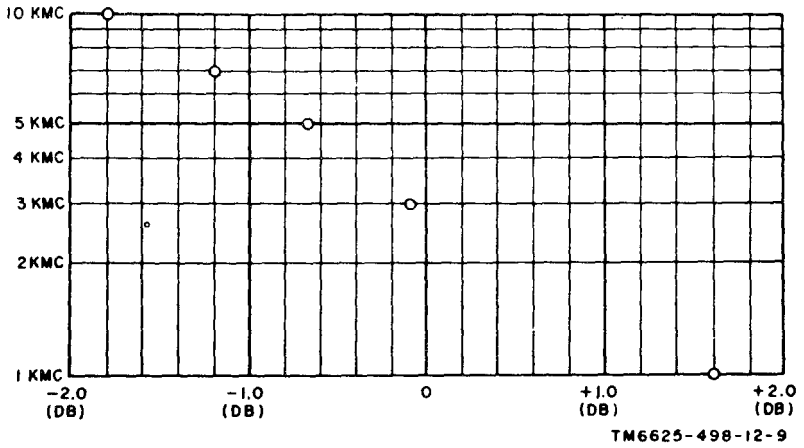


Figure 5. Sample attenuator calibration plate

Frequency (mc)	Correction factor (db)
0	0
10	+0.05
100	+0.15
300	+0.25
1,000	+0.5
2,000	+0.9
4,000	+1.3
7,000	+2.0
10,000	+2.7

Note: Interpolate intermediate frequencies linearly.

19. POWER Control Scales (fig. 4)

a. Outermost and Center Scales. When rf power is measured (BIAS-READ switch in READ position), the POWER control is adjusted for a null indication on the NULL INDICATOR meter and the rf power is indicated in watts (below the hairline) on the outermost and center scales as shown in the following chart.

Scale	Power range switch position		Power level range, no attenuators used	Multiply indication below hairline at null by	Power level range, one 10-db attenuator used	Multiply indication below hairline at null by	Power level range, two 10-db attenuators used	Multiply indication below hairline at null by	Power level range, two 10-db and 7-db attenuator used	Multiply indication below hairline at null by
Outermost	1.0 MW	0 DBM	0-1 mw	1	0-10 mw	10	0-100 mw	100	0-.5 watts	500
Outermost	10 MW	+10 DBM	0-10 mw	10	0-100 mw	100	0-1 watt	1,000	0-5 watts	5,000
Center ---	.30 MW	-5 DBM	0-.3 mw	.1	0-3 mw	1	0-30 mw	10	0-150 mw	50
Center ---	3.0 MW	+5 DBM	0-3 mw	1	0-30 mw	10	0-300 mw	100	0-1.5 watts	500

b. Innermost Scale. The innermost scale provides readings in db for all positions of the POWER RANGE switch and is used to compute the rf power being measured. The setting of the POWER RANGE switch and the number of attenuators used determine the db correction factor. This factor is added algebraically to the indication on the POWER control (innermost scale) when a null is achieved on the NULL INDICATOR meter and provides the rf power level in db. The calibration plate correction factor for the rf cord, if used (para 18), is to be added algebraically to the final indication. The following chart lists the correction factors in db to be added algebraically to the indication below the hairline of the innermost scale:

Power range switch position	No attenuator used	One 10-db attenuator used	Two 10-db attenuators used	Two 10-db attenuators and one 7-db attenuator used
.30MW -5 DBM	-5	+5	+15	+22
1.0 MW 0 DBM	0	+10	+20	+27

Power range switch position	No attenuator used	One 10-db attenuator used	Two 10-db attenuators used	Two 10-db attenuators and one 7-db attenuator used
3.0 MW +5 DBM	+5	+15	+25	+32
10 MW +10 DBM	+10	+20	+30	+37

c. Conversion of Decibels to Watts. When the sum of the calibration plate correction factors (attenuator, para 16; rf cord, if used, para 18) exceeds ±2.2 db, it is necessary to convert decibels to watts. Subparagraph (1) below describes the method used for most conditions. Subparagraph (2) below describes an alternate method when the procedure described in (1) below is not applicable:

(1) When the sum of the calibration plate correction factors is greater than ±2.2 db, set the COMP ATTENUATOR control to 0, and determine the rf power level as described in *a* or *b* above. When using the innermost scale *(b* above), algebraically add the sum of the calibration plate correction factors directly to the final indication (db correction factor) determined using the chart in *b* above. When using the outermost or center scale *(a* above), obtain the equivalent value in db at null (by reading on the innermost scale below the hairline). To this equivalent db value, algebraically add the sum of the calibration plate correction factors. Rotate the POWER control to the resultant value and refer back to the outermost or center scales, and read the rf power level under the hairline. For example, assume the value on the POWER control at null is .25 on the outermost scale with the POWER RANGE switch set to 1.0 MW 0 DBM. Assume that it is required to add a calibration plate correction factor of +3 db. The value in db that corresponds to 0.25 mw is -6 db. The algebraic addition of +3 db to -6 db is -3 db. Rotating the POWER control to -3 db and reading back to the outermost scale gives an indication of .50. This is the rf power level in mw. If the algebraic sum of calibration plate correction factors and the reading on the innermost scale result in a db total greater than zero, set the POWER RANGE switch to the next lower position (counterclockwise) and obtain a null once again. If this fails to result in a negative total, continue to decrease the setting of the POWER RANGE switch until a negative total is achieved. If this cannot be accomplished, use the method in (2) below.

(2) Because of the slide-rule-type construction of the POWER control, indications on the center and outermost scales can be accurately transferred by introducing a factor of -5-db on the innermost scale. For example, 1.6 mw on the center scale at -3 db on the innermost scale is equivalent to 1.6 mw on the outermost scale at -8 db on the innermost scale (when considering the proper multiplication factor *(a* above)). The procedure for switching scales is to obtain the db equivalent for one scale (reading below the hairline on the innermost scale), adding, ±5 db (as applicable) to it, and reading back to the other scale. This procedure can be used when a positive value for the sum of the calibration plate correction factors and the db equivalent are obtained ((1) above). For example, assume a power level of 0.281 mw is obtained at null on the center scale with the POWER RANGE switch set for .30 MW -5 DBM. Assume also that the calibration plate correction factor total is +3 db. The equivalent in db of 0.281 mw is -0.5 db. The addition of +3

db to this would result in a positive total (+2.5 db). Solve this calculation by adding -5 db to the -0.5 db equivalent, and then adding the calibration plate correction factor of +3 db. This results in a value of -2.5 db on the innermost scale and read back to the outermost scale. The answer (after considering the proper multiplication factor) is 0.565 mw.

20. Preliminary Starting Procedure (fig. 6)

a. Determine the maximum rf power being measured (para 17). Determine the attenuators to use for maximum sensitivity of the power meter without exceeding the maximum permissible rf input power.

Caution: Do not exceed the maximum permissible rf input power for the thermistor mount and attenuators used. Damage to the thermistor mount or attenuators may result.

b. Attach connector MS3102E-14S-5P on the thermistor mount to connector MS3106E-14S-5S on the rf cable.

c. Attach Connector UG-23E/U on the thermistor mount to the attenuators and the rf cord as required.

Caution: Do not connect the rf power from equipment under test to the power meter at this time.

d. Set the power meter controls as follows:

Switch	Position
LINE ON ---------	Off (down)
COMP ATTENUATOR	0 Ω
THERM RES ------	200 Ω
BIAS-READ —-----	BIAS

e. Connect the ac pqwer cable to a 115-volt, 50- to 1,000-cps ac source.

21. Starting Procedure

a. Operate the LINE ON switch to ON. The power indicator lamp will glow.

b. Allow a 15 minute warmup period.

Note: The equipment is protected againat overload by a fuse. Repeated blowing of this fuse indicates an overload which may result in damage to the equipment.

22. Calibrating Power Meter

a. Perform procedures in paragraphs 20 and 21.

b. Adjust BIAS COARSE control for an approximate null indication on the NULL INDICATOR meter.

c. Adjust BIAS FINE control for an exact null indication on the NULL INDICATOR meter.

23. Rf Power Measurement

a. General.

(1) Perform the procedures in paragraphs 20, 21, and 22.

(2) When the level of the rf power source is between 0 and 10 mw, refer to ***(b)*** below.

(3) When the level of the rf power source is between 10 and 100 mw, refer to (c) below.

(4) When the level of the rf power source is between 100 mw and 1 watt, refer to (d) below.

(5) When the level of the rf power source is between 1 and 5 watts, or is unknown, refer to (e) below.

Caution: Never exceed the maximum permissible rf power input to the power meter. Failure to observe this precaution may result in damage to the equipment.

b. O- ***to 10-MW Measurement.***

(1) Set the POWER RANGE switch to 10 MW +10 DBM.

(2) Connect the power meter to the equipment to be tested. Use the rf cord only when necessary.

(3) If the rf cord is used, determine its calibration plate correction factor (para 18). If this factor is less than +2.2 db, set the COMP ATTENUATOR co nt ro 1 to this value. If this correction factor is greater than +2.2 db, note the value, set the COMP ATTENUATOR control to 0, and continue.

(4) Turn on the rf power source to be measured and rotate the **POWER**

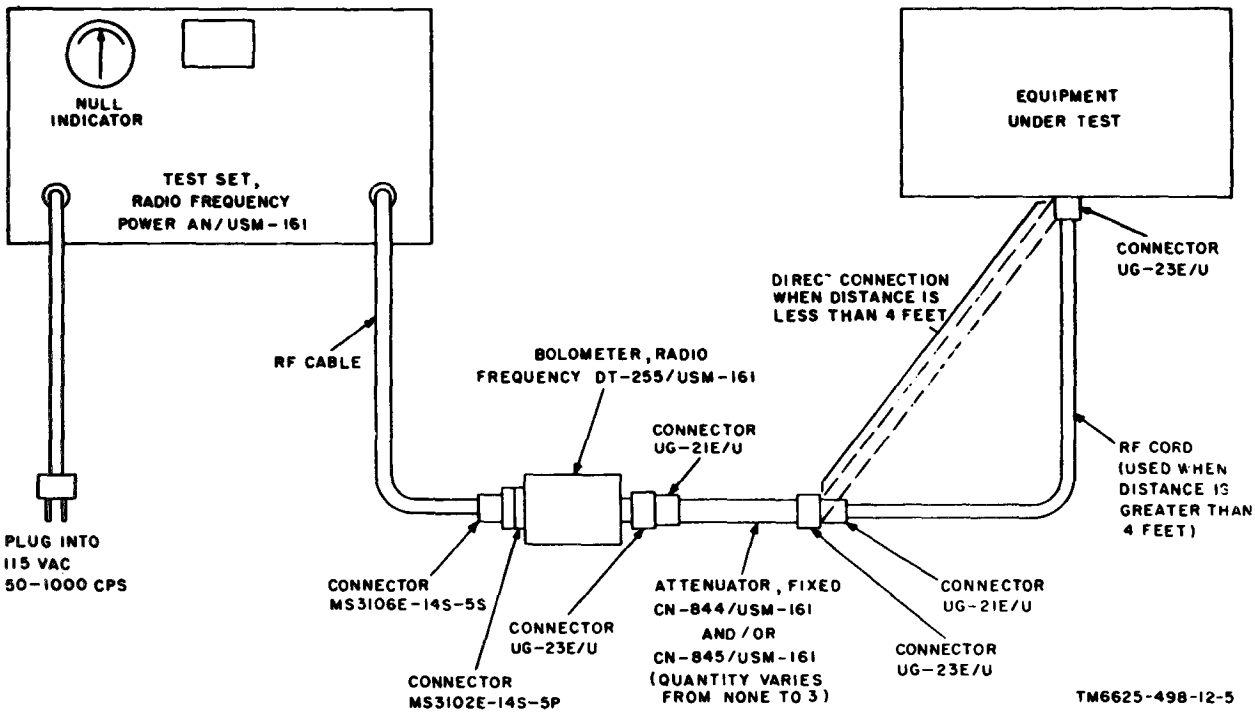


Figure 6. Typical test setup.

control until a null is indicated on the NULL INDICATOR meter. If this indication (below the hairline) is near zero, set the POWER RANGE switch to the next lower position, and rotate the POWER control to obtain a null on the NULL INDICATOR meter. Repeat this procedure until a convenient reading (near midrange) is obtained on the POWER control at null.

(5) If the rf power level is desired in mw, refer to paragraph 19a. In addition, if the calibration plate correction factor noted in (3) above is greater than +2.2 db, refer to paragraph 19c. The result is the actual rf power level in mw.

(6) If the rf power level is desired in db, refer to paragraph 19b. If the calibration plate correction factor noted in (3) above is greater than +2.2 db, add this factor to the db correction factor (para 19b). This is the actual power level in decibels referred to 1 milliwatt in 600 ohms (dbm).

c. 10- to 100-Mw Measurement.

(1) Set the POWER RANGE switch to 10 MW +10 DBM.

(2) Attach one 10-db attenuator to the thermistor mount.

(3) Connect the power meter to the equipment to be tested. Use the rf cord only when necessary.

(4) Determine the calibration plate correction factor for the attenuator (para 16). In addition, if the rf cord is used, determine its calibration plate correction factor (para 18). Add the two correction factors. If the sum is between -2.2 and +2.2 db, set the COMP ATTENUATOR control to this value. If this correction factor is greater than ±2.2 db, note the value, set the COMP ATTENUATOR control to 0, and continue.

(5) Turn on the rf power source to be measured and rotate the POWER control until a null is indicated on the NULL INDICATOR meter. If this indication (below the hairline) is near the zero, set the POWER

RANGE switch to the next lower position and rotate the POWER control to obtain a null on the NULL INDICATOR meter. Repeat this procedure until a convenient reading (near midrange) is obtained on the POWER control at null.

(6) If the rf power level is desired in mw, refer to paragraph 19a. In addition, if the correction factor total noted in (4) above is not between -2.2 and +2.2 db, refer to paragraph 19c. The result is the actual rf power level in mw.

(7) If the rf power level is desired in db, refer to paragraph 19b. If the calibration plate correction factor total noted in (4) above is not between -2.2 and +2.2 db, add this factor to the db correction factor (para 19b). This is the actual power level in dbm.

d. 100-Mw to 1-Watt Measurement.

(1) Set the POWER RANGE switch to 10 MW +10 DBM.

(2) Attach the two 10-db attenuators to the thermistor mount.

(3) Connect the power meter to the equipment to be tested. Use the rf cord only when necessary.

(4) Determine the calibration plate correction factors for the attenuators (para 16). In addition, if the rf cord is used, determine its calibration plate correction factor (para 18). Add the correction factors. If the sum is between -2.2 and +2.2 db, set the COMP ATTENUATOR control to this value. If this correction factor is greater than ±2.2 db, note the value, set the COMP ATTENUATOR control to 0, and continue.

(5) Turn on the rf power source to be measured and rotate the POWER control until a null is indicated on the NULL INDICATOR meter. If this indication (below the hairline) is near zero, set the POWER RANGE switch to the next lower position and rotate the POWER control to obtain a null on the NULL INDICATOR meter. Repeat this procedure until a convenient reading (near midrange) is obtained on the POWER control at null.

(6) If the rf power level is desired in mw, refer to paragraph 19a. In addition, if the correction factor total noted in (4) above is not between -2.2 and +2.2 db, refer to paragraph 19c. The result is the actual rf power level in mw.

(7) If the rf power level is desired in db, refer to paragraph 19b. If the calibration plate correction factor total noted in (4) above is not between -2.2 and +2.2 db, add this factor to the db correction factor (para 19b). This is the actual power level in dbm.

e. 1- to 5-Watt Measurement.

(1) Set the POWER RANGE switch to 10 MW +10 DBM.

(2) Attach the two 10-db and the 7-db attenuators to the thermistor mount.

(3) Connect the power meter to the equipment to be tested. Use the rf cord only when necessary.

(4) Determine the calibration plate correction factors for the attenuators (para 16). In addition, if the the rf cord is used, determine its calibration plate correction factor (para 18). Add the correction factors. If the sum is between -2.2 and +2.2 db, set the COMP ATTENUATOR control to this value. If this correction factor is greater than ±2.2 db, note the value, set the COMP ATTENUATOR control to 0, and continue.

(5) Turn on the rf power source to be measured and rotate the POWER control until a null is indicated on the NULL INDICATOR meter. If this indication (below the hairline) is near zero, set the POWER RANGE switch to the next lower position and rotate the POWER control to obtain a null on the NULL INDICATOR meter. Repeat this procedure until a convenient reading (near midrange) is obtained on the POWER control at null.

(6) If the rf power level is desired in watts, refer to paragraph 19a. In addition, if the correction factor total noted in (4) above is not between -2.2 and +2.2 db, refer to paragraph 19c. The result is the actual rf power level in watts.

(7) If the rf power level is desired in db, refer to paragraph 19b. If the calibration plate correction factor total noted in (4) above is not between -2.2 and +2.2 db, add this factor to the db correction factor (para 19b). TM is the actual power level in dbm.

(8) If an unknown power level is being measured and the null point occurs at zero (or very close to zero) on the POWER control, remove the 7-db attenuator and refer to *d* above. If the null point still occurs at zero (or close to zero), continue to remove the attenuators until a convenient reading on the POWER control at null is obtained. When a convenient reading (near midrange) is obtained on the POWER control at null, refer to the applicable information to determine the rf power level measured.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S MAINTENANCE

24. Scope of Operator's Maintenance

a. The following is a list of maintenance duties normally performed by the operator of the test set. These procedures do not require special tools or test equipment.

b. Operator's maintenance for the test set consists of the following:

(1) Preventive maintenance (para 25).
(2) Visual inspection (para 26).
(3) Operational check (para 27).
(4) Replacement of defective power indicator lamp (para 28a).
(5) Replacement of defective fuse (para 28b).
(6) Replacement of defective tubes (para 28c).

25. Preventive Maintenance

a. DA Form 11-266. DA Form 11-266 (fig. 7 and 8) is a preventive maintenance checklist to be used by the operator. Items not applicable to the test set 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. Instructions for the use of the form appear on the form.

b. Items. The information shown in the chart below supplements DA Form 11-266. The item numbers correspond to the ITEM numbers on the form.

Warning: **Cleaning compound is flammable and its fumes are toxic. Do not use near a flame; provide adequate ventilation. Never use cleaning compound on plastic or on the calibrated dials.**

Item	Maintenance procedures
1	Use a clean cloth to remove dust, dirt, moisture, and grease from the transit case and front panel. If necessary, wet the cloth with Cleaning Compound (Federal stock No. 7930-395-9542) and then wipe the parts with a dry, clean cloth.
3	All control knobs should work smoothly, be tight on the shafts, and should not bind. Be sure that the knobs do not rub against the front panel. If the calibrated dials are loose, higher echelon repair is required.
5	Repair any cuts in the power cord or input cable insulation by covering them with rubber tape and then with friction tape.
11	Check the NULL INDICATOR meter for broken or cracked glass. Check the Power and COMP ATTENUATOR controls for broken or cracked plastic. Check to see that the captive screws on the front panel are tight.

26. Operator's Visual Inspection

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

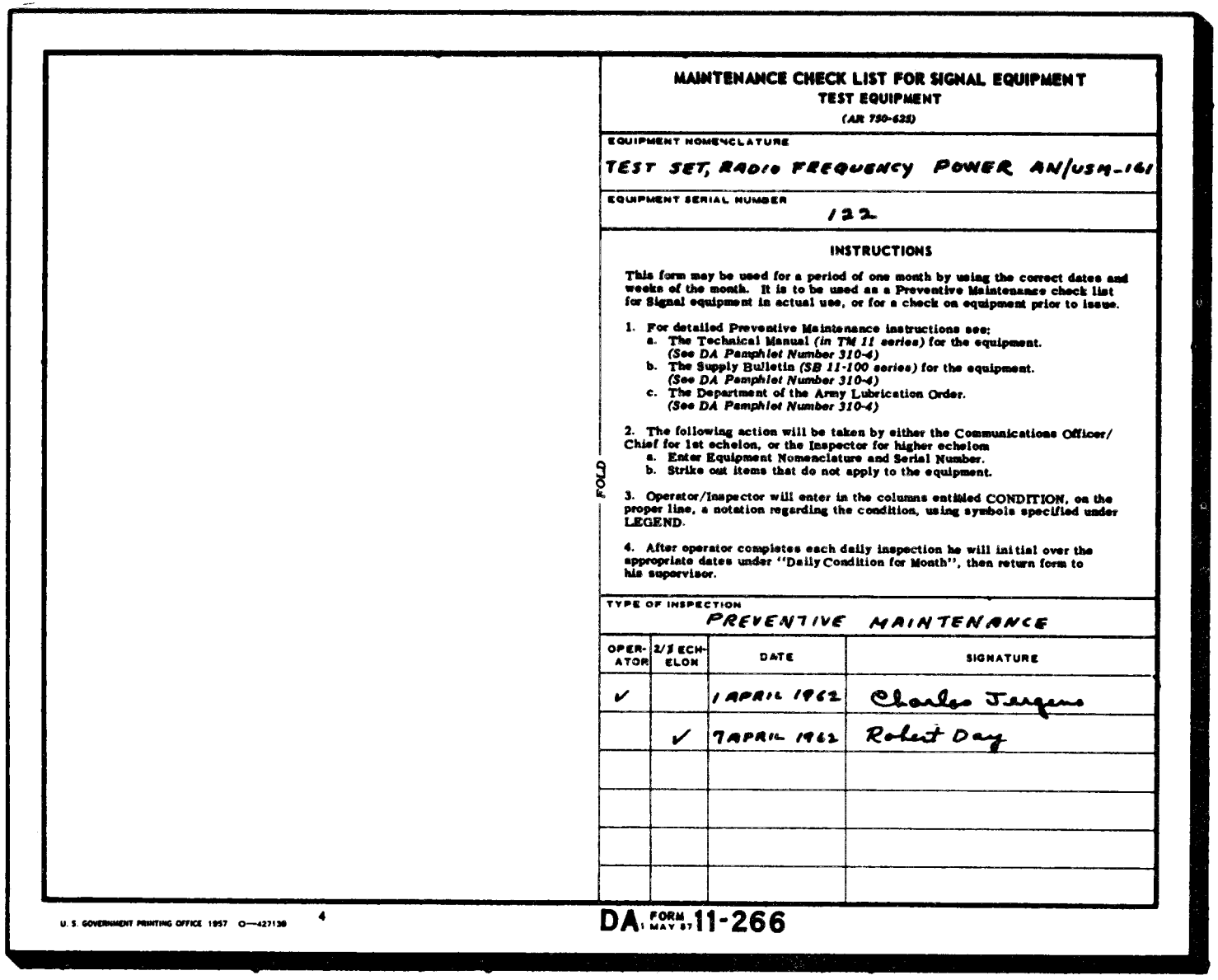
(1) Wrong settings of controls.
(2) Burned-out fuse (usually indicates some other fault).
(3) Improper attenuator or thermistor mount used.
(4) Defective associated external equipment, such as attenuators or thermistors.

b. If the above checks do not locate the trouble, proceed to the operational checklist (para 27).

27. Operational Checklist

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

b. Procedure. Place the test set in operation (para 20 and 21) and perform the



MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
TEST EQUIPMENT
(AR 750-625)

EQUIPMENT NOMENCLATURE: TEST SET, RADIO FREQUENCY POWER AN/USM-161

EQUIPMENT SERIAL NUMBER: 122

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 echelons
   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.

FOLD

TYPE OF INSPECTION: PREVENTIVE MAINTENANCE

OPERATOR	2/3 ECHELON	DATE	SIGNATURE
✓		1 APRIL 1962	Charles Jergens
	✓	7 APRIL 1962	Robert Day

U. S. GOVERNMENT PRINTING OFFICE 1957 O—427136

4

DA FORM 1 MAY 57 11-266

TM6625-498-12-6

Figure 7. DA Form 11-266, pages 1 and 4.

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

DAILY CONDITION FOR MONTH OF APRIL 62

NO.	DAILY ITEM	1 CJ 17	2 CJ 18	3 CJ 19	4 CJ 20	5 CJ 21	6 CJ 22	7 CJ 23	8 24	9 25	10 26	11 27	12 28	13 29	14 30	15 31	16	2D 3D ECHELON
1.	CLEAN DIRT AND MOISTURE FROM EXPOSED SURFACES OF ~~HOUSINGS, CASES~~, CABINETS, CONTROL PANELS, INTERCONNECTING PLUGS, CABLES, ~~HEADSETS~~, METER WINDOWS, ETC. PARA 25b	✓	✓	✓	✓	✓	✓	✓										
2.	INSPECT FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS SWITCHES, ~~KNOBS, JACKS~~, CONNECTORS AND PILOT LIGHTS.	✓	✓	✓	✓	✓	✓	✓										
3.	INSPECT CONTROLS FOR BINDING, SCRAPING. TAP CONTROLS LIGHTLY FOR CUT-OUT DUE TO LOOSE CONTACTS. PARA 25b	✓	✓	✓	✓	✓	✓	✓										
4.	DURING OPERATION BE ALERT FOR ANY UNUSUAL PERFORMANCE OR CONDITION.	✓	✓	✓	✓	✓	✓	✓										

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D 3D ECH
5. INSPECT CORDS, CABLES, ~~WIRE AND SHOCK MOUNTS~~ FOR BREAKS, CUTS, KINKS, DETERIORATION, STRAIN AND FRAYING. PARA 25b	✓					
6. ~~INSPECT CANVAS AND LEATHER ITEMS FOR FUNGUS, FRAYING, TEARS, BROKEN ZIPPERS AND SNAP FASTENERS.~~						
7. HAND CHECK FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS HANDLES, LATCHES, HINGES.	X					
8. ~~INSPECT FOR LUBRICATION IN ACCORDANCE WITH APPLICABLE LO LUBRICATION ORDER.~~						
9. ~~INSPECT DRY BATTERIES FOR DIRT, LOOSE TERMINALS AND LEAKAGE.~~						
10. INSPECT EXPOSED METAL SURFACES FOR RUST AND CORROSION.	✓					
11. INSPECT METERS FOR DAMAGED GLASS ~~AND CASES~~. PARA 25b	✓					

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
12. ~~INSPECT SEATING OF READILY ACCESSIBLE ITEMS OF A PLUG-OUT NATURE; CRYSTALS, FUSES, CONNECTORS, PLUG-IN COILS, LAMPS, ETC. DO NOT REMOVE, ROCK OR TWIST TO INSPECT. USE ONLY A DIRECT PRESSURE TO INSURE THE ITEM IS FULLY SEATED.~~	
13. ~~INSPECT FOR CLEANLINESS AND TIGHTNESS OF SUCH ITEMS AS SHOCK MOUNTS, ANTENNA, ANTENNA MOUNTS AND WAVE GUIDES.~~	
14. ~~INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR DIRT, CORROSION, WORN OR BURNED CONTACTS.~~	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. ~~INSPECT RESISTORS, BUSHINGS, INSULATORS FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE.~~	
16. ~~INSPECT JACKS AND CONNECTORS FOR SNUG FIT AND GOOD CONTACTS.~~	
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT AND MOISTURE.~~	
18. ~~INSPECT AIR FILTERS FOR CLEANLINESS.~~	
19. ~~INSPECT SCREWTYPE TERMINALS OF TRANSFORMERS, FIXED CAPACITORS, RESISTORS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR CORROSION, DIRT AND LOOSE CONTACTS.~~	
20. ~~CLEAN AND TIGHTEN SWITCHES, BLOWERS, RELAY CASES; CLEAN INTERIOR OF CHASSIS AND CABINETS.~~	
21. ~~INSPECT GENERATORS, MOTORS AND DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND COMMUTATOR WEAR.~~	
22. ~~INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.~~	
23. ~~INSPECT GASKETS AND BUSHINGS FOR WEAR AND DAMAGE.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNED SCREEN SPOTS.~~	
25. ~~BEFORE STORING OR SHIPPING~~ REMOVE ALL BATTERIES.	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. *(Continue on page 4, if more space is needed)*

ITEM 7. HANDLE BROKEN. REPORTED TO 2D ECHELON MAINTENANCE FOR REPAIR.

2 3

TM6625-498-12-7

Figure 8. DA Form 11-266, pages 2 and 3, as used by operator.

steps in *c* below in the order given. Observe the equipment operation and perform any corrective measures necessary. The steps are made with the test set not connected to any source of rf power. The only connection to be made to the rf cable is to attach the thermistor mount. Be sure the THERM RES switch is in the 200 Ω position.

c. Checklist.

Action	Normal indication	Corrective measures
Set the LINE ON switch to ON ------	Power indicator lamp lights -------	Check the fuse, power indicator lamp, and connector on the ac power cable.
Set the BIAS-READ switch to BIAS. Rotate the BIAS COARSE control. (The positions of ths other controls will not affect this procedure.)	The needle on the NULL INDICATOR should deviate.	Check the thermistor mount connections. Substitute a different thermistor mount if a spare is available. Higher echelon repair is required,
Rotate the BIAS FINE control -----	The needle on the NULL INDICATOR should deviate.	Check the thermistor mount connections. Substitute a different thermistor mount if a spare is available Higher echelon repair is required.
Adjust the BIAS COARSE control for an approximate null indication and than adjust the BIAS FINE control for an exact null indication.	An exact null indication on the NULL INDICATOR meter.	Check the thermistor mount connections. Substitute a different thermistor mount if a spare is available. Higher echelon repair is required.

28. Repairs and Adjustments (fig. 1 and 3)

a. Replacement of Defective Power Indicatar Lamp. The test set has one indicator lamp, mounted on the front panel. To remove the plastic cap over the lamp, turn it counterclockwise and gently pull out the cap. Remove the lamp.

b. Replacement of Defective Fuse. The test set has one fuse mounted on the front panel. Turn the knob marked FUSE counterclockwise, and remove the fuse cap and fuse. Replace the defective fuse with an identical fuse and replace the knob.

c. Replacement of Defective Tubes. When trouble occurs, check all cabling, parts, wiring, and connections before removing any tubes. If tube failure is suspected, use the applicable procedure below to check the tubes.

Caution: Do not rock or rotate stubs when removing it from a socket; pull it straight out with a tube puller. All tubes in the power meter are preferred-type tubes. Do not replace any preferred-type tube with nonpreferred tubes.

(1) Release the six captive screws on the front panel.

(2) Withdraw the unit from its case by using the two handles. The tubes then are readily accessible.

Caution: If tube V4 (5651WA) requires replacement, return the test set to higher echelon for recalibration.

(3) Replace a suspected tube with a new tube. If the equipment still does not work, remove the new tube and put back the original tube. Repeat this procedure with each suspected tube until the suspected tube is located.

Section II. SECOND ECHELON MAINTENANCE

29. Scope of Second Echelon Maintenance

Organizational maintenance of the test set consists of the following

a. Preventive maintenance (para 31).

b. Visual inspection (para 32).

c. Equipment performance check (para 33).

d. Repairs and adjustments (para 34).

30. Tools and Materials Required

The tools and materials required for organizational maintenance are as follows:

a. Tools. The only tools required are those tools normally available to the

repairman-user because of his assigned mission.

b. *Materials.*

(1) Cleaning compound (Federal stock No. 7930-395-9542).

(2) Cleaning cloth.

31. Second Echelon Preventive Maintenance

DA Form 11-266 (fig. 9) is a preventive maintenance checklist to be used by the second echelon. Items not applicable to the equipment are lined out in the figure. Additional preventive maintenance information concerning items 1, 3, 5, and, 11 on DA Form 11-266 is found in paragraph 25. Instructions for the use of the form appear on the form.

32. Second Echelon Visual inspection

Before operating the test set, inspect it. Inspection will save repair time and may also avoid further damage. Disconnect the ac power cable and make the following checks:

Warning: Do not check any item with the power on.

a. Check for broken or damaged meter.

b. Check for loose or binding knobs.

c. Check for completeness of equipment and damage to accessory items.

33. Equipment Performance Checklist

a. General. The equipment performance checklist provides a procedure for systematically checking equipment performance. All corrective measures that the second echelon repairman can perform are given in the *Corrective measures* column. When using the checklist, start at the beginning and follow each step in order. If the corrective measures indicated do not fix the equipment, maintenance is required by a higher echelon. Note on the repair tag how the equipment performed and the corrective measures that were taken.

b. Procedure. The only connection to be made is to attach the thermistor mount to the rf cable. Place the power meter in operation as shown in the checklist below.

c. Equipment Performance Checklist.

Step	Action	Normal indication	Corrective measures
1	Set the LINE ON switch to ON. (The positions of the other controls will not affect this procedure.)	Power indicator lamp lights ----	Check the fuse, indicator lamp, and connector on the ac power cable.
2	Allow a 15 minute warmup period.		
3	Set the THERM RES switch to 200 Ω , the COMP ATTENUATOR control to 0, and the BIAS-READ switch to BIAS. Adjust the BIAS COARSE and FINE controls for an exact null indication on the NULL INDICATOR meter.	An exact null indication on the NULL INDICATOR meter.	Check the setscrews on the BIAS COARSE and FINE controls. Replace the knobs.
4	Set the BIAS-READ switch to READ. Set the POWER control to 0.	An exact null indication on the NULL INDICATOR meter.	Higher echelon repair is required.
5	Rotate the POWER control ---	The needle on the NULL INDICATOR meter should deviate.	Higher echelon repair is required.
6	Set the LINE ON switch to off (down).		

34. Second Echelon Repairs and Adjustments

The unit repairman's repairs and adjustments on the test set consist of replacing front panel knobs and tightening front panel setscrews. When replacing a knob on a switch, note the setting of the switch before replacement. Make sure the switch is in the same position after replacement. If the setscrews in the calibrated dials are loose, return the test set for higher echelon repair.

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

DAILY CONDITION FOR MONTH OF APRIL '62

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.	CLEAN DIRT AND MOISTURE FROM EXPOSED SURFACES OF ~~HOUSINGS, GAGES~~, CABINETS, CONTROL PANELS, INTERCONNECTING PLUGS, CABLES, ~~HEADSETS~~, METER WINDOWS, ETC.																	✓
2.	INSPECT FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS SWITCHES, KNOBS, JACKS, CONNECTORS AND PILOT LIGHTS.																	✓
3.	INSPECT CONTROLS FOR BINDING, SCRAPING. TAP CONTROLS LIGHTLY FOR CUT-OUT DUE TO LOOSE CONTACTS.																	✓
4.	DURING OPERATION BE ALERT FOR ANY UNUSUAL PERFORMANCE OR CONDITION.																	✓

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D & 3D ECH
6. INSPECT CORDS, CABLES, ~~WIRE AND SHOCK MOUNTS~~ FOR BREAKS, CUTS, KINKS, DETERIORATION, STRAIN AND FRAYING.						✓
6. ~~INSPECT CANVAS AND LEATHER ITEMS FOR FUNGUS, FRAYING, TEARS, BROKEN SLIDERS AND SNAP FASTENERS.~~						
7. HAND CHECK FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS HANDLES, LATCHES, HINGES.						✓
8. ~~INSPECT FOR LUBRICATION IN ACCORDANCE WITH APPLICABLE LUBRICATION ORDER.~~						
9. ~~INSPECT DRY BATTERIES FOR DIRT, LOOSE TERMINALS AND LEAKAGE.~~						
10. INSPECT EXPOSED METAL SURFACES FOR RUST AND CORROSION.						✓
11. INSPECT METERS FOR DAMAGED GLASS ~~AND GAGES~~.						X

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
12. INSPECT SEATING OF READILY ACCESSIBLE ITEMS OF A PLUCK-OUT NATURE: ~~CRYSTALS~~, FUSES, CONNECTORS, ~~PLUG-IN COILS~~, LAMPS, ETC. DO NOT REMOVE, ROCK OR TWIST TO INSPECT. USE ONLY A DIRECT PRESSURE TO INSURE THE ITEM IS FULLY SEATED.	✓
13. ~~INSPECT FOR CLEANLINESS AND TIGHTNESS OF SUCH ITEMS AS SHOCK MOUNTS, ANTENNA, ANTENNA MOUNTS AND WAVE GUIDES.~~	
14. ~~INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR DIRT, CORROSION, WORN OR BURNED CONTACTS.~~	

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
15. ~~INSPECT RESISTORS, BUSHINGS, INSULATORS FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE.~~	
16. INSPECT ~~JACKS AND~~ CONNECTORS FOR SNUG FIT AND GOOD CONTACTS.	✓
17. ~~INSPECT VARIABLE CAPACITORS FOR DIRT AND MOISTURE.~~	
18. ~~INSPECT AIR FILTERS FOR CLEANLINESS.~~	
19. ~~INSPECT SCREWTYPE TERMINALS OF TRANSFORMERS, FIXED CAPACITORS, RESISTORS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR CORROSION, DIRT AND LOOSE CONTACTS.~~	
20. ~~CLEAN AND TIGHTEN SWITCHES, BLOWERS, RELAY GAGES. CLEAN INTERIOR OF CHASSIS AND CABINETS.~~	
21. ~~INSPECT GENERATORS, MOTORS AND DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND COMMUTATOR WEAR.~~	
22. ~~INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.~~	
23. ~~INSPECT GASKETS AND BUSHINGS FOR WEAR AND DAMAGE.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNED SCREEN SPOTS.~~	
25. ~~BEFORE STORING OR SHIPPING, REMOVE ALL BATTERIES.~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. *(Continue on page 4, if more space is needed)*

ITEM 11. BROKEN GLASS ON NULL INDICATOR METER. REPORTED TO HIGHER MAINTENANCE ECHELON.

2 3

TM6625-498-12-8

Figure 9. DA Form 11-266, pages 2 and 3, as used by second echelon.

CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

35. Disassembly of Equipment

Disassembly of the test set consists of disconnecting the rf cord. attenuators, thermistor mount, and rf cable and securing these parts in the transit case.

36. 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 circumstances permit. The information concerning the original packaging (para 9) will also be helpful.

a. Materials Required. The following materials are required for packaging the test set. For stock numbers of materials, consult SB 38-100.

Material	Quantity
Filler material	4 lb
Corrugated cardboard	32 sq ft
Gummed tape	17 ft
Gummed waterproof tape	20 ft
Waterproof paper	16 sq ft

b. Packaging. Package the test set as follows :

(1) Cushion the test set on all surfaces with pads of filter material.
(2) Place the cushioned unit within a wrap of corrugated cardboard.
(3) Secure the wrap with gummed tape.
(4) Protect the corrugated cardboard wrap with a waterproof paper barrier.
(5) Seal the seams of the paper barrier with waterproof tape.

c. Packing.

(1) Place the package containing the test set in a wooden box.
(2) Nail a wooden lid on the box.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

37. Authority for Demolition

The demolition procedures given in paragraph 38 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

38. Methods of Destruction

Any or all of the methods of destruction given below may be used. The time available will be the major determining factor for the methods to be used in most instances when destruction of equipment is undertaken. The tactical situation also will determine how the destruction order will be carried out. In most cases, it is preferable to demolish completely some portions of the equipment rather than partially to destroy all the equipment parts.

a. Smash. Remove the test set from its transit case. Smash the transit case; use sledges, axes, hammers, crowbars, or any other heavy tools available.

b. Cut. Cut cables, cords, and wires; use axes, machetes, and similar tools.

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

c. Burn. Burn the technical manuals first. Use gasoline, kerosene, flamethrowers, or incendiary grenades to complete the destruction of the test set.

d. Explode. If explosives are necessary, use firearms, grenades, powder

charges, or explosives to demolish the equipment where feasible or necessary.

e. Dispose. Scatter or bury destroyed parts or throw them into waterways. This is particularly important if a number of parts have not been completely destroyed.

APPENDIX I

REFERENCES

Following is a list of references available to the operator and unit repairman of the test set.

DA Pamphlet 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army.

APPENDIX II

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*. This column shows only the nomenclature or standard item name. 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.

(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, meter, etc.

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

(h) Calibrate. To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or component of a weapons system.

(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.

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.

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PART OR COMPONENT	MAINTENANCE FUNCTION	1ST ECH	2D ECH	3D ECH	4TH ECH	5TH ECH	TOOLS REQUIRED	REMARKS
TEST SET, RADIO FREQUENCY POWER AN/USM-161.	service	---	---	---	X			
	adjust	---	---	---	X	---	7, 16, 18	
	inspect	---	---	---	X	---	18, 19	
	test	---	---	---	---	X	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19.	
	test	---	---	---	X	---	15	
	replace							
	repair	X	---	---	---	---	20 ----------	1st echelon repair is limited to replacement of running spare items.
	repair	---	X	---	---	---	20 ----------	2d echelon repair is limited to replacement of running spare items pluck-out items, and knobs, except calibrated knobs.
	repair	---	---	---	X	---	18, 19	
	align	---	---	---	---	X	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19.	
	calibrate	---	---	---	---	X	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 14, 16, 17, 18, 19.	
	overhaul	---	---	---	---	X	18, 19	
BOLOMETER, RADIO FREQUENCY DT-255/USM-161.	service							
	adjust							
	inspect							
	test							
	replace	---	X	---	X	---	18, 19-------	4th echelon repair is limited to replacement of thermistor disk and capacitor.
	repair							
	repair	---	---	---	---	X	18, 19	
	align							
	calibrate							
	overhaul							
TEST SET, RADIO FREQUENCY POWER TS-1776/USM-161.	service							
	adjust							
	inspect							
	test							
	replace							
	repair	X	---	---	---	---	20----------	1st echelon repair is limited to replacement of running spare items.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PART OR COMPONENT	MAINTE-NANCE FUNCTION	1ST ECH	2D ECH	3D ECH	4TH ECH	5TH ECH	TOOLS REQUIRED	REMARKS
CABLE ASSEMBLY, RADIO FREQUENCY CG-2514/U (6 ft).	repair	---	X	---	---	---	20----------	2d echelon repair is limited to replacement of running spares, pluck-out items, and knobs, except calibrated knobs.
	repair align calibrate	---	---	---	X	---	18, 19	
	overhaul service adjust inspect test replace	---	---	---	---	X	18, 19	
	repair align calibrate overhaul	---	---	---	X	---	18, 19	

Section III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	1ST ECH	2ND ECH	3RD ECH	4TH ECH	5TH ECH	TOOL CODE	RE-MARKS
AUDIO LEVEL INDICATOR WEINSCHEL, MODEL 1N1	---	---	---	---	1	1	
ATTENUATOR WEINSCHEL, MODEL CF-1	---	---	---	---	1	2	
BOLOMETER WEINSCHEL, MODEL BA-18	---	---	---	---	1	3	
BOLOMETER PRO #610A W/FXR MOUNT N200A	---	---	---	---	1	4	
COAXIAL SLOTTED UNIT IM-92/U	---	---	---	---	1	5	
DOUBLED STUD TURNER NARDA MODEL 903N	---	---	---	---	2	6	
POWER SUPPLY PP-962/U	---	---	---	---	1	8	
PAD, 30DB	---	---	---	---	1	9	
INDICATOR, STANDING WAVE RATIO AN/USM-37A	---	---	---	---	1	10	
SIGNAL GENERATOR SG-104/MRQ-7	---	---	---	---	1	11	
SIGNAL GENERATOR AN/URM-61	---	---	---	---	1	12	
SIGNAL GENERATOR AN/URM-52A	---	---	---	---	1	13	
TEST SET, ELECTRON TUBE TV-2/U	---	---	---	---	1	14	
TEST SET, ELECTRON TUBE TV-7/U	---	---	---	1	---	15	
MULTIMETER ME-26B/U	---	---	---	1	1	7	
VOLTMETER, ELECTRONIC ME-30B/U	---	---	---	1	1	16	
WATTMETER ME-159/U	---	---	---	---	1	17	
TOOL KIT TK-87/U	---	---	---	1	1	18	
TOOL KIT TK-88/U	---	---	---	1	1	19	
TOOLS AND TEST EQUIPMENT NORMALLY AVAILABLE TO REPAIR USER BECAUSE OF HIS ASSIGNED MISSION.	1	1	---	---	---	20	

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

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.

2. Columns

a. Source, Maintenance, and Recoverability Code. Not used.

b. Federal Stock Number. This column lists the 11-digit Federal stock number.

c. Designation by Model. Not used.

d. Description. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

e. Unit of Issue. The unit of issue is each, unless otherwise indicated, and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

f. Expendability. Expendable items are not indicated. Non-expendable items are indicated by NX.

g. 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," the quantities 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.

h. Illustrations. The "Figure No." column lists the figure numbers used for identification of the items in the "Description" column. The "Item No." column lists the reference symbols used for identification of the items in illustration or text of the manual.

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.	ITEM NO.
----------	----------	----------	TEST SET, RADIO FREQUENCY POWER AN/USM-161.	ea	NX			
			ITEMS COMPRISING AN OPERABLE EQUIPMENT.					
	Order thru AGC	----------	TM 11-6625-498-12 ----------	ea	X	2	1	
	5905-856-8854	----------	ATTENUATOR, FIXED CN-844/USM-161.	ea	X	1	1	
	5905-856-8855	----------	ATTENUATOR, FIXED CN-845/USM-161	ea	X	2	1	
			BOLOMETER, RADIO FREQUENCY DT-255/USM-161.	ea	X	1	1	
			CABLE ASSEMBLY, RADIO FREQUENCY CG-2515/U (6 ft).	ea	X	1	1	
			TEST SET, RADIO FREQUENCY POWER TS-1776/USM-161.	ea	NX	1	1	
	6625-857-5301	----------	COVER, TEST SET, CASE: alum; 2 hinges, 2 latches; 14" lg 10" wd x 2.81" d o/a; General Microwave part No. 1623, Sheet 2.	ea	X	1	1	
			RUNNING SPARES AND ACCESSORIES.					
			TEST SET, RADIO FREQUENCY POWER AN/USM-161.					
			NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON.					
			TEST, SET, RADIO FREQUENCY POWER TS-1776/USM-161					
	5960-166-7661	----------	ELECTRON TUBE: JAN type 6X4WA	ea	X	1	1	V1
	5960-262-0167	----------	ELECTRON TUBE: JAN type 12AT7WA.	ea	X	1	1	V10
	5960-577-3078	----------	ELECTRON TUBE: JAN type 5687WA.	ea	X	1	1	V2, V7
	5960-705-9094	----------	ELECTRON TUBE: JAN type 5751	ea	X	2	1	V3, V5, V6 V11.
	5960-669-6861	----------	ELECTRON TUBE: JAN type 6005/6AQ5W.	ea	X	1	1	V9
	5920-280-4465	----------	FUSE, CARTRIDGE: lamp; 250 v; Mil type FO2G1R00A.	ea	X	5	1	F1
	6240-155-8706	----------	LAMP, INCANDESCENT: GE type 47.	ea	X	1	1	DS1

By Order of Secretary of the Army:

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

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USATC AD (2)
USATC Armor (2)
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USATC Inf (2)
USATC FA (2)
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Atlanta GENDEP (None)
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WRAMC (1)
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Army Tml (1)
POE (1)
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USAEPG (2)
AFIP (1)
AMS (1)
Army Pictorial Cen (2)
EMC (1)
Yuma Teat Sta (2)
USACA (3)
USASSA (20)
USASSAMRO (1)
USASEA (1)
USARCARIB Sig Agcy (1)
USA Sig Msl Spt Agcy (13)
Sig Fld Maint Shops (3)
USA Corps (3)
Def Log Svc Cen (1)
JBUSMC (2)
Units org under fol TOE:
(2 each UNOINDC)
11-7
11-16
11-57
11-98
11-117
11-155
11-157
11-500 AA-AE (4)
11-557
11-587
11-592
11-597

NC: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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