DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A

Headquarters, Department of the Army, Washington 25, D.C.

29 May 1963

WARNING

Be careful when working on the -220- or +220-volt power circuits, or the 115-volt ac circuit. Serious injury or death may result from contact with these voltages.

DON'T TAKE CHANCES!

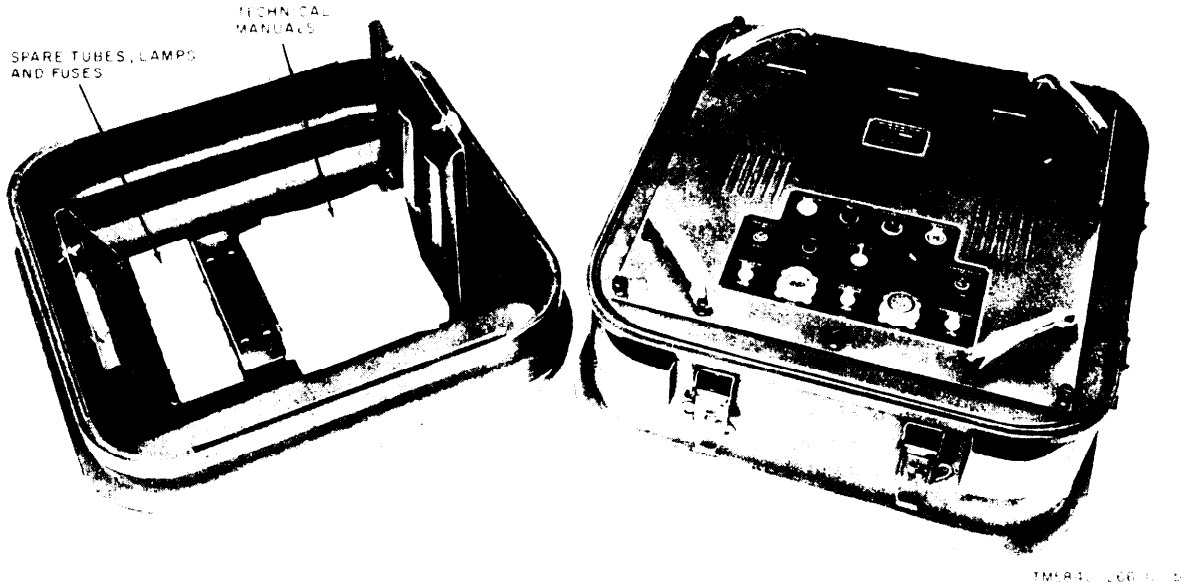

Figure 1. Simulator, Antenna Position SM-154-/MPQ-4A.

Change No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *31 August 1973*

Operator and Organizational Maintenance Manual
SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A

TM 11-6625-541-12, 29 May 1963, is changed as follows:

Page 3, 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 810-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO'S) pertaining to the equipment.

Paragraph 3. Delete paragraph 3 and substitute:

3. Forms and Records

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

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) **as** prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361') as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy)/ AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

Paragraph 3.1 is added after paragraph 3.

3.1. Reporting of Equipment Publication-Improvements

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

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

6. Items Comprising an Operable Equipment

Simulator, Antenna Position SM-154;MPQ-4A (FSN 6625-064-6010) comprises the operable end item.

Page 22, 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 only basic issue items required by the crew/operator for installation, operation, and maintenance, of Simulator, Antenna Position SM-154/MPQ-4A.

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.						
		6625-892-3849	7830289P009	24446	CASE, COORDINATED DATA SIMULATOR, CASE FOR SPARE PARTS FOR SM-154/MPQ-4A	EA	1

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WSMR(l)
Army Dep(2) except
LBAD(14)
SAAD(30)
TOAD(14)
LEAD(3)
ATAD(10)
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USAERDAW (1)
MAAG(l)
USARMIS(l)
Units org under fol TOE
(1 copy each):
11-158
11-500 (AA-AC)
29-134
29-136

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

*U.S. GOVERNMENT PRINTING OFFICE: 1973-754339/53

TM 11-6625-541-12
C 2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *5 September 1978*

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A

(NSN 6625-00-064-6010)

TM 11-6625-541-12, 29 May 1963, is changed as follows:

The title of this manual is changed as shown above.

Page 3. Paragraphs 2, 3, and 3.1 are superseded as follows:

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.

3. 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 (Packaging Improvement Report) as prescribed in AR 700-58 NAVSUPINST 4030.29 AFR 71-13 MCO P4030.29A. and DLAR 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 4610.33B AFR 75-18 MCO P4610.19C and DLAR 4500.15.

3.1. Reporting of Errors

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q. Fort Monmouth, NJ 07703.

Paragraph 3.2. is added:

3.2. Reporting Equipment Improvement Recommendations (EIR)

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

3.3. Destruction of Army Electronics Material

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

Page 18. Appendix II is superseded as follows:

APPENDIX II

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

II-1. General.

This appendix provides a summary of the maintenance operations for SM-154 MPQ-4A. 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.

II-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 prescribe 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.

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 services 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 equipments components.

II-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, assemblies, 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 "worktime" 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 "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" 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.

II-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.

II-5. Remarks (Sec 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.

(Next printed page is II-3.)

SECTION II MAINTENANCE ALLOCATION CHART
FOR
SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A	Inspect	0.2						
		Test		0.5				1 thru 6	
		Test				1.0		1 thru 12	
		Test					1.0	1 thru 12	
		Repair		0.5				1 thru 6	A
		Repair				1.0		1 thru 14	
		Repair					1.0	1 thru 14	
		Align				0.6		1 thru 14	
		Align					0.6	1 thru 14	
		Overhaul					3.0		
01	TRIGGER PULSE GENERATOR	Test		0.2				1 thru 6	
		Repair		0.5				1 thru 6	A
		Repair				0.5		1 thru 12	
		Align				0.5		1 thru 13	
		Align					0.5	1 thru 13	
02	ANTENNA PULSE SIMULATOR	Test		0.2				1 thru 6	
		Repair		0.5				1 thru 6	A
		Repair				0.5		1 thru 12	
		Align				0.5		1 thru 13	
		Align					0.5	1 thru 13	
03	ANTENNA AZIMUTH SYNCHRO	Test		0.2				2 thru 6	
		Repair				0.5		2 thru 6	
		Align				0.5		2 thru 6	
		Align					0.5	2 thru 6	
04	ANTENNA ELEVATION SYNCHRO	Test		0.2				2 thru 6	
		Repair				0.5		2 thru 6	
		Align				0.5		2 thru 6	
		Align					0.5	2 thru 6	
05	AZIMUTH MARKER SYNCHRO	Test		0.2				2 thru 6	
		Repair				0.5		2 thru 6	
		Align				0.5		2 thru 6	
		Align					0.5	2 thru 6, 9	
06	CASE, COORDINATED DATA SIMULATOR	Inspect					0.5		
		Repair					1.5		B
		Overhaul					3.0		B

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL NATO STOCK NUMBER	TOOL NUMBER
1	O,H,D	TEST SET, ELECTRONIC TUBE TV-7D/U	6625-00-820-0064	
2	O,H,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-101/G	5180-00-064-5178	
3	O,H,D	MULTIMETER ME-26B/U	6625-00-646-9409	
4	O,H,D	MOTOR GENERATOR PU-200/U	6125-00-244-8451	
5	O,H,D	MOTOR GENERATOR PU-335/MPM-25	6125-00-823-0257	
6	O,H,D	TEST FACILITIES KIT MK-387/MPM-49	6625-00-786-4136	
7	H,D	OSCILLOSCOPE AN/USM-281	6625-00-053-3112	
8	H,D	TEST SET, ELECTRONIC TUBE TV-2( )U	6625-00-669-0263	
9	H,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	
10	H,D	GENERATOR, SIGNAL SG-299/U	6625-00-624-3516	
11	H,D	COUNTER, ELECTRONIC DIGITAL READOUT AN/USM-207A	6625-00-044-3228	
12	H,D	FIXED RESISTOR, 75Ω, 1/2 WATT	5905-00-279-1758	
13	H,D	FIXED RESISTOR, 750Ω, 1/2 WATT	5905-00-104-8337	
14	H,D	SYSTEM ERROR BRIDGE, THETA MODEL NO. ST-110-3	6625-01-028-8357	

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	REPLACE ELECTRONIC TUBES, TUBE SHIELDS, TUBE ADAPTERS, LAMPS, LENSES, FUSES AND KN0BS.
B	AVAILABLE DEPOT TOOLS.

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USAIS (2)
USAES (2)
USAICS (3)
MAAG (1)
USARMIS (1)
USAERDAA (1)
USAERDAW (1)
Fort Carson (5)
Fort Gillem (10)
Fort Gordon (10)
Fort Huachuca (10)
Ft Richardson (CERCOM Ofc) (2)
Army Dep (1) except
LBAD (14)
SAAD (30)
TOAD (14)
SHAD (3)
USA Dep (1)
Sig Sec USA Dep (1)
Units org under fol TOE:
29-207 (2)
29-610 (2)
11-500 (AA-AC) (1)
29-134 (1)
29-136

NG: None

USAR: None

For explanation of abbreviations used see, AR 310-50

***U.S. GOVERNMENT PRINTING OFFICE: 1978-765096 1077**

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

This manual describes Simulator, Antenna Position SM-154/MPW-4A (fig. 1) and covers its installation, operation, and organizational maintenance. It includes instructions appropriate to first and second echelons for preventive maintenance and troubleshooting. Throughout this manual, Simulator, Antenna Position SM-154/MPQ-4A will be referred to as the simulator.

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. Department of the Army Pamphlet No. 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.

3. 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: SE LMS-MP, Fort Monmouth, New Jersey. (DA Form 1598 (Record of Comments on Publications), DA Form 2496 (Disposition Form), or letter may be used.)

Section II. DESCRIPTION AND DATA

4. Purpose and Use

a. The simulator is a source of signals, normally generated in Radar Set AN/MPQ-4A, required when bench-servicing Indicator, Azimuth and Range IP-375/MPQ-4A (indicator) and Computer, Radar Data CP-319/MPQ-4A (computer). It may also be used as a pulse generator when servicing Amplifier, Trigger Pulse AM-1537/MPQ-4A and Control, Receiver C-2015/MPQ-4A. Outputs can be obtained which simulate the following signals:

(1) Deadtime pulses.
(2) Azimuth strobe pulses.
(3) Trigger pulses.
(4) Azimuth synchro data.
(5) Elevation synchro data.
(6) Azimuth strobe synchro data.

b. Connections for servicing the indicator and the computer by use of the simulator are shown in figure 2. Power for the units being serviced and for the simulator is obtained from Power Supply PP-1588/MPQ-4A. Interconnection Box J-982/MPM-49, the cables, and Power Supply PP-1588/MPG)-4A are components of Test Facilities Kit MK-387/MPM-49. The simulator and Test Facilities Kit MK-387/MPM-49 are part of Maintenance Kit, Electronic Equipment MK-673/MPQ-4A.

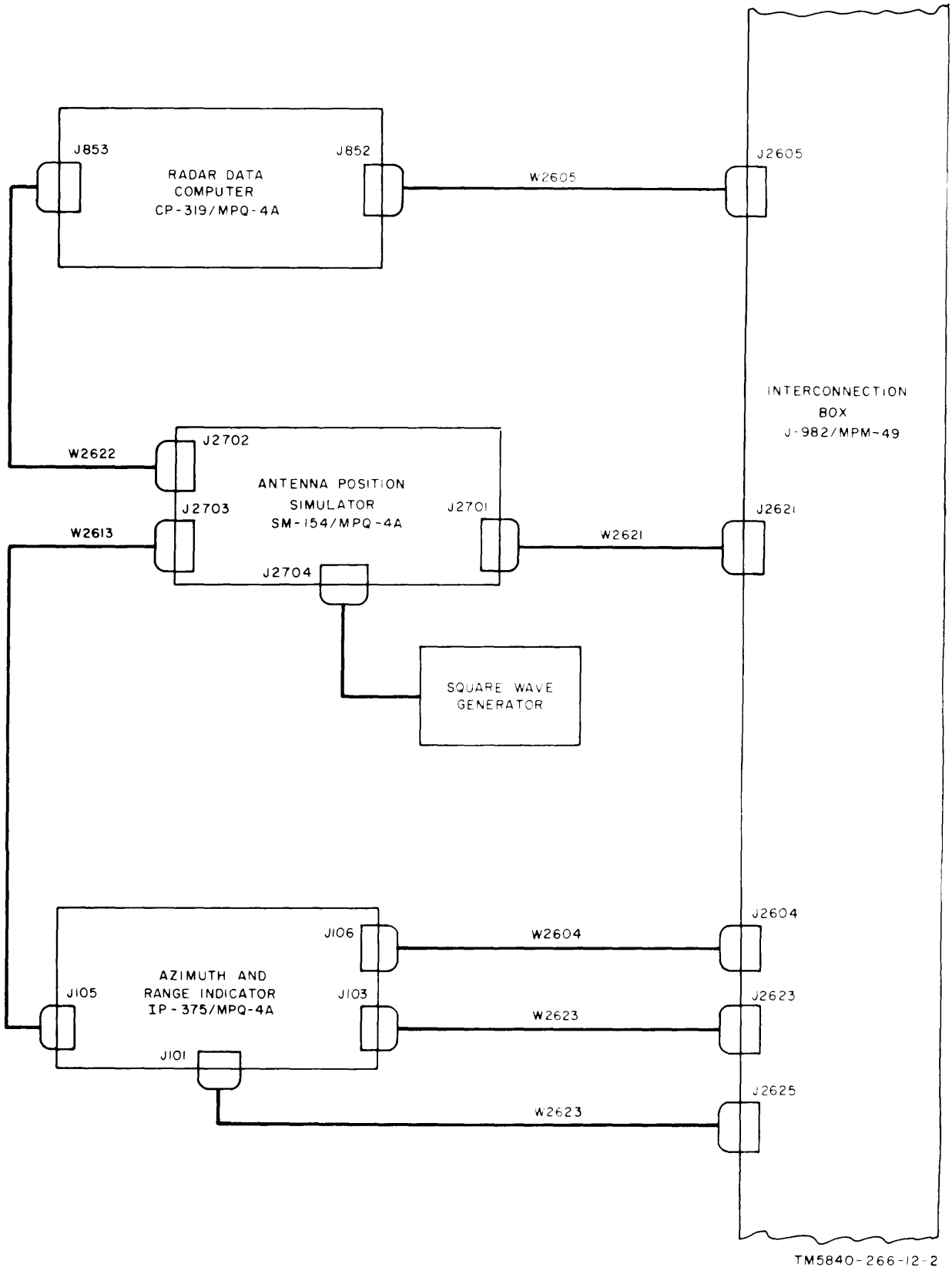

Figure 2. Simulator test setup.

5. Technical Characteristics

Types of output:

Deadtime pulses . . . . Pairs of negative pulses, 3,000 microseconds apart, recurring at 30,000-microsecond intervals. Pulse width approximately 175 microseconds, amplitude 0.5 volt minimum.

Azimuth strobe pulses . . . . Positive pulses, width and amplitude same as for deadtime pulses, manually positioned between-alternate pairs of deadtime pulses.

Trigger pulses . . . . Positive pulses, width 1 microsecond +0.25, amplitude 20 to 40 volts, prf 8,600 1 sec ±100.

Azimuth synchro data . . . . . 400-cycle, two-speed synchro data, handwheel control. Coarse-fine ratio 1 to 9.

Elevation synchro data . . 400-cycle, single-speed synchro data, handwheel control

Azimuth strobe Synchro data . . . . . 400-cycle, single-speed synchro data. Servosystem control from computer.

Input requirements . . . . . 115 volts ac, single-phase, 400 cycles, 23 watts. 208/115 volts ac, three-phase, 400 cycles, 14 watts +220 volts dc, 10 watts. -220 volts dc, 1 watt.

Number of tubes . . . . . 10.

Weight (including transit case) . . . . . 75 pounds.

6. Table of Components

The components of the SM-154/MPQ-4A are listed in the basic issue items list (appx III). The major components are illustrated in figure 1.

7. Description of Simulator, Antenna Position SM-154/MPQ-4A (fig. 1)

a. The simulator consists of a two-part transit case and an operating panel. All controls and connectors are mounted on the front of the operating panel. All electrical components and three synchro assemblies are mounted at the rear of this panel. The operating panel is mounted within the lower section of the transit case for protection. The upper half of the transit case provides storage space for two technical manuals, spare tubes, indicator lamps, and fuses for the simulator. The upper and lower sections of the transit case fit together in a waterproof, dustproof seal and are held together by eight trunk-type latches.

b. The simulator parts are mounted on the front panel assembly and on five removable subassemblies. The parts on each subassembly are assigned reference designation numbers in separate blocks of 100. The subassemblies and the number blocks associated with each are listed in (1) through (6) below:

(1) Trigger pulse generator (2100).
(2) Antenna azimuth synchro (2300).
(3) Antenna elevation synchro (2400).
(4) Azimuth marker synchro (2500).
(5) Front panel (2700).
(6) Antenna pulse simulator (2800).

c. Power for the simulator is supplied by Motor Generator PU-335/MPM-25, Motor Generator PU-20C/U, and Control-Power Supply C-2014/MPQ-4A. Power from the above sources is routed through Interconnecting *Box* J-982/MPM-49 for switching and fusing before being applied to the simulator.

8. Additional Equipment Required

The following equipment is not supplied but is required for the operation of the simulator:

a. Motor Generator PU-335/MPM-25 and Cable Assembly, Power CX-4455/U(W2609) are required to supply a three-phase, 400-cycle voltage for the antenna azimuth, antenna elevation, and azimuth marker synchro assemblies.

b. Motor Generator PU-20C/U and Cable Assembly, Power CX-4454/U (W2610) are required to supply 115-volt, single-phase, 400-cycle voltage to the primary of the filament voltage transformer.

c. Control Power Supply C-2014/MPQ-4A and Cable Assembly, Power CX-4447/U (W2608) supply +220 and-220 voltage to the simulator.

d. Interconnecting Box J-982/MPM-49 provides switching and fusing facilities for input power to the simulator.

e. Cable Assembly, Power CX-4449/U (W2621) is required to connect the simulator to Interconnecting Box J-982/MPM-49.

f. If external synchronization is to be used with the simulator, Square Wave Generator SG-299/U and a signal cable will be required.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

9. Unpacking

a. Packaging Data. Two types of packaging are used for the simulator. For domestic shipment or short-term storge, the simulator within its transit case is placed in a corrugated carton and sealed. The carton is placed within a plywood box containing cushioning material of 2-inch-thick Resilo-Pak. For oversea shipment or long-term storage, the corrugated carton containing the simulator is wrapped in moisture-vaporproof barrier paper with desiccant added and an overwrap of waterproof paper barrier; then the entire package is placed in a plywood box containing cushioning material of Resilo-Pak as shown in figure 3. The box is 30 by 30 by 18 inches (9.3 cu ft) and weighs 84 pounds when packed.

b. Removing Contents.

(1) Remove the nails from the top of the plywood box with a nailpuller. Do not attempt to pry off the cover because this may damage the equipment.

(2) Remove the wrapped carton from the plywood box.

(3) Remove the waterproof barrier and the moisture-vaporproof wrapping from the corrugated carton.

(4) Remove the equipment from the corrugated carton.

10. Checking Unpacked Equipment

a. Inspect the simulator for possible shipping damage. If the equipment has been damaged, refer to paragraph 3.

b. Check the equipment against the packing list. When no packing list accompanies the equipment, refer to appendix III or the packaging data (para 9) as a general check.

11. Operator's Controls and Instruments (fig. 4)

The tab1e below lists and outlines the functions of the controls, the test jacks and the cable connections of the simulator.

Control	Function
Azimuth handwheel.	Determines bearing of simulated azimuth data being supplied to equipment under test as indicated on ANT AZ MILS dial.
Elevation handwheel.	Determines angle of simulated elevation data being supplied to equipment under test as indicated on ANT EL MILS dials.
ANT EL MILS3 dial	Indicates simulated elevation position as set by elevation handwheel.
AZ STROBE POS knob	Positions azimuth strobe on lower-beam trace.
TRIG OUTPUT TEST J2705 jack.	Provides means of monitoring TRIG PULSE OUTPUT signal.
SCANNER OUTPUT TEST J2706 jack . .	Provides means of monitoring SCANNER DATA OUTPUT signal.
TRIG PULSE OUTPUT J2708 jack	Provides auxiliary 8,600-cycle system trigger.
SCANNER DATA OUTPUT J2703 jack . .	Provides panel termination for simulated antenna pulse Output.
34 CPS SQ WAVE INPUT J2704 jack . . .	Couples external 34-cps square wave to antenna pulse simulator when SQ WAVE SEL switch is at EXT position.
GRD J2707 jack	Provides panel ground connection.
SQ WAVE SEL switch	Selects internal or external signal for driving antenna pulse simulator.
SIM PWR J2701 jack	Provides input power connection to simulator.
SYNCHRO DATA J2702 jack.	Provides panel termination for output simulated synchro signals.
SYNCHRO DATA PWR ON indicator light	Indicates presence of synchro input power.
SIM PWR ON indicator light	Indicates presence of simulator ac input power.
FUSE .5 AMP	Protects against filament circuit overload.
BLOWN FUSE IND.	Indicates blown fuse when lighted.

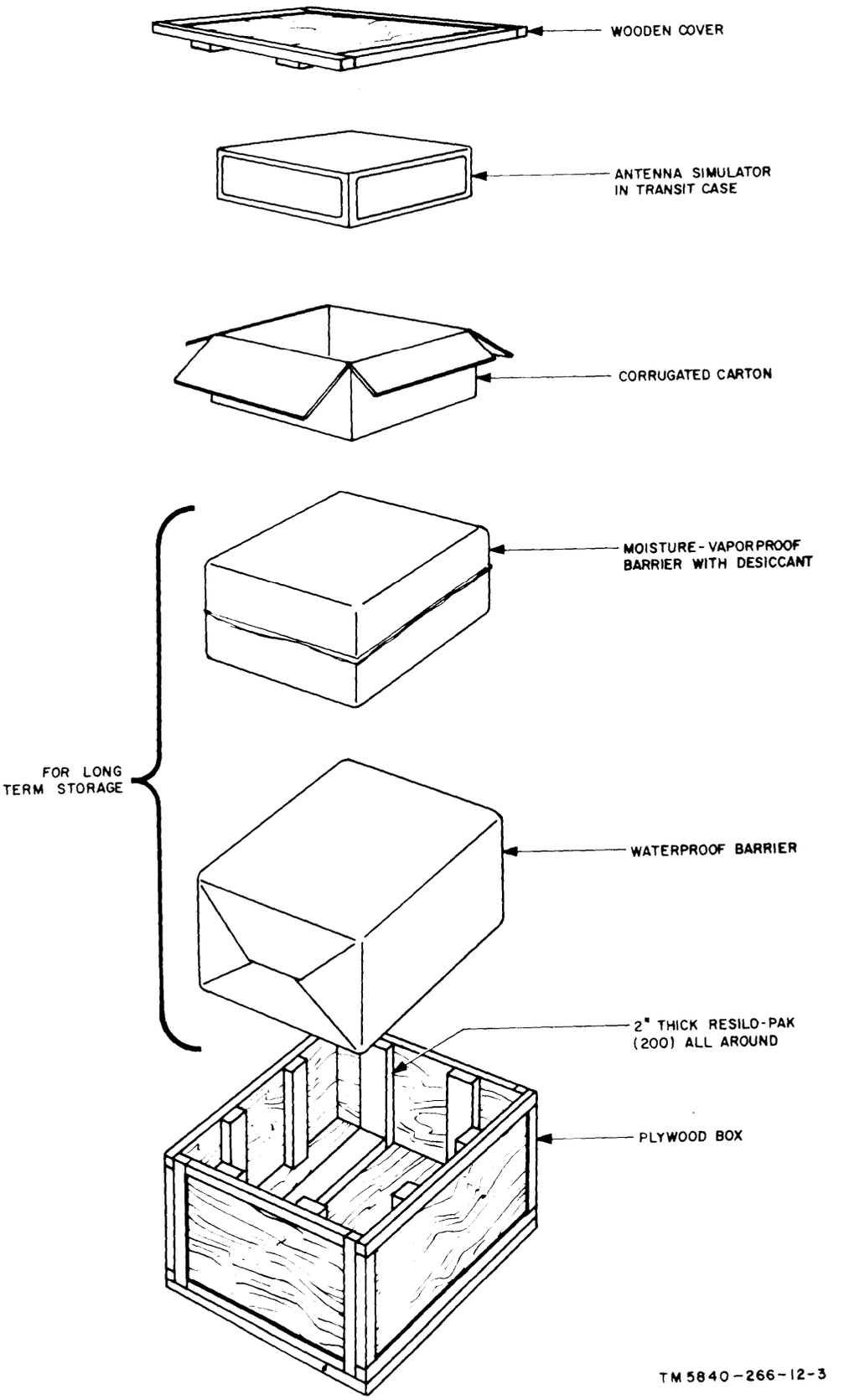

Figure 3. Simulator, typical packaging.

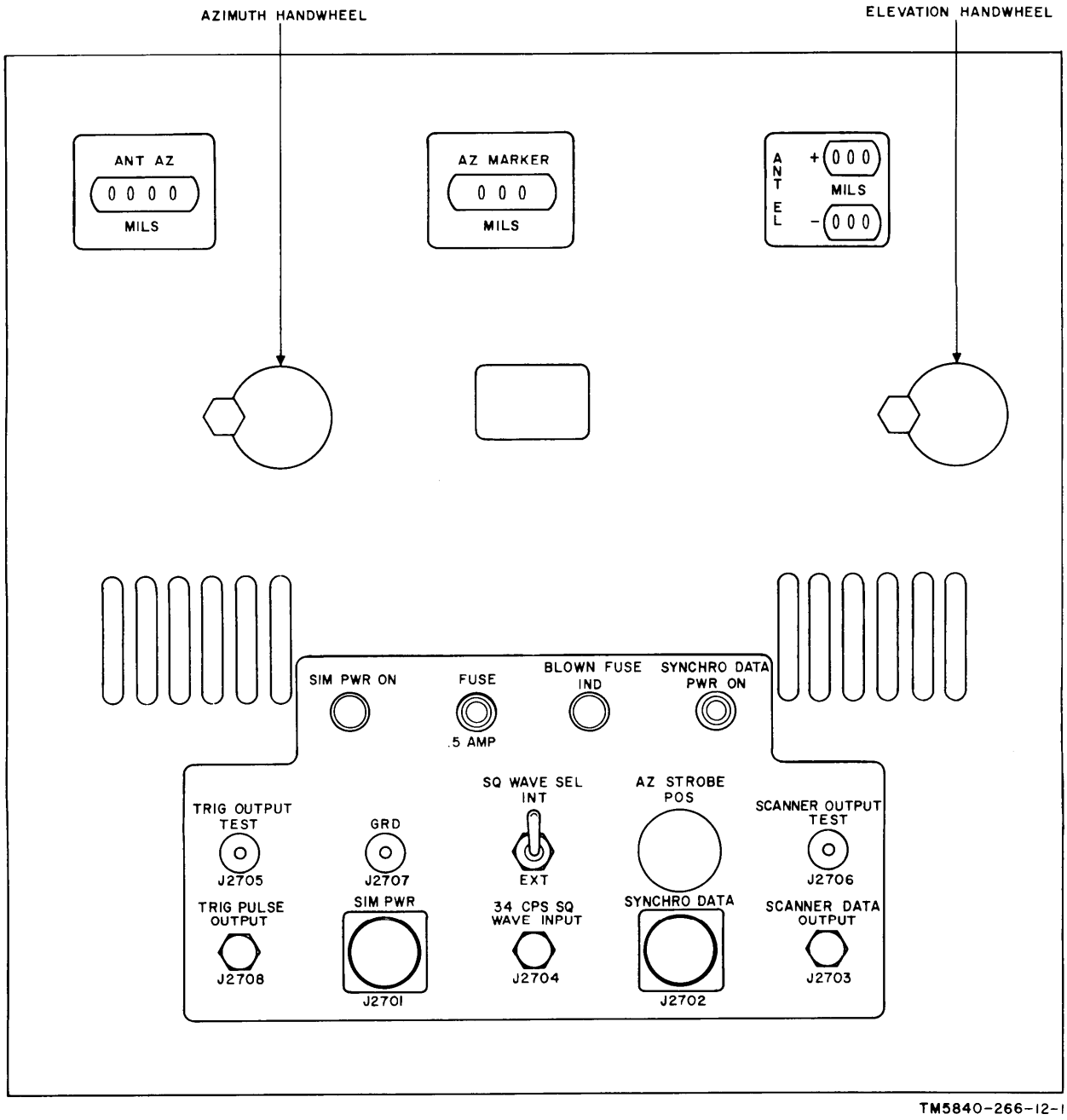

Figure 4. Front panel controls and indicators.

12. Preliminary Instructions

Connect the simulator to Interconnecting Box J-982/MPM-49, and to Computer Radar Data CP-319/MPQ-4A or Indicator, Azimuth and Range IP-375/MPQ-4A as shown in figure 2. If it is required to drive the antenna pulse simulator by-an external square-wave generator, connect its output to the 34 CPS SQ WAVE INPUT jack.

13. Operating Procedure

a. Apply power to the simulator by closing SIM FOR COMP switch S2609 and SIM

FOR IND switch S2610 on Interconnecting Box J-982/MPM-49.

Set the SQ WAVE SE L switch to INT internal synchronization is to be used. if external synchronization is to be used, this switch should be set to EXT and the output of an external square-wave generator connected to jack J2704.

c. The azimuth handwheel is rotated to change simulated azimuth data to the bearing required by the test procedure. Likewise, the elevation handwheel is rotated to change simulated elevation data to the angle required by the test procedure.

d. The azimuth strobe position as determined by control *settings* on the computer under test, is indicated by the AZ MARKER MILS dial on the simulator. The position of the azimuth strobe on the indicator unit is independent of the dial reading.

e. AZ STROBE POS control is rotated to change the position of the azimuth strobe on the indicator unit. The controls on the computer that normally determine the position of the azimuth strobe do not affect its position.

f. Specific settings of the controls are given in test and alignment procedures in the radar equipment manual (see appendix I).

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. GENERAL

14. Scope of Maintenance

This chapter covers organizational (1st and 2d echelon) maintenance of the simulator. Preventive maintenance procedures are contained in paragraphs 16 through 21. Troubleshooting procedures are contained in paragraphs 22 through 25.

15. Test Equipment and Materials Required

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

a. Materials.

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

(2) Cleaning cloth.

b. Test Equipment.

(1) Test Set, Electron Tube TV-7/U.

(2) Test Facilities Kit MK-387/MPM-49.

(3) Motor Generator PU-335/MPM-25.

(4) Motor Generator PU-20C/U.

Section II. PREVENTIVE MAINTENANCE

16. General

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 17 through 21 cover routine systematic care and cleaning essential to proper upkeep and operation of equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 18 and 19) outline functions to be performed at specific intervals. These checks and services are designed to maintain Army equipment in a serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist personnel in maintaining serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the *Reference* Column lists the illustrations or paragraphs that contain detailed repair or replacement procedures. If the defect cannot be remedied by organizational personnel, higher echelon maintenance or repair is required. Records and reports of these checks and services must be made in accordance with TM 38-750.

17. Maintenance Checks and Services Periods

Maintenance checks and services on the simulator are required on a daily and monthly bases. Items in the monthly chart are in addition to those in the daily chart. Equipment in a standby (ready for immediate operation) condition, must have monthly maintenance performed on it. Equipment in limited storage (requires service before operation) does not require maintenance.

18. Daily Preventive Maintenance Checks and Services

Sequence No.	Item	Procedure	Reference
1	Exterior surfaces	Clean the carrying case, the front panel, and the dial windows. Spot-paint bare spots.	Para 20.
2	Cabling and connectors	Check to see that cables and connectors are intact and properly connected.	Fig. 2.
3	Switch, knobs, and dials.	While making the operating checks (items 4 through 10), observe that the mechanical action of switch, knob, and dial is smooth and free of external or internal binding.	
4	SIM, FOR IND. switch on Interconnecting Box J-982/MPM-49.	Operate to apply power to the simulator. Observe that: *a.*. BLOWN FUSE IND does not light. *b.* SIM PWR ON indicator and dial lights light.	Para 23.
5	SIM FOR COMP. switch on Interconnecting BOX J-982/MPM-49.	Operate to apply power to the simulator. Observe that SYNCHRO DATA PWR ON indicator light lights.	Para 23.
6	AZ STROBE POS control.	Rotate. Observe that position of azimuth strobe on indicator unit varies as control is rotated.	Para 23.
7	LOWER BEAM AZIMUTH control on the computer.	Rotate. AZ MARKER MILS dials on simulator follows.	
8	Azimuth handwheel on simulator.	Rotate. Observe that AZIMUTH MILS dial on computer follows ANT AZ MILS dial on simulator.	
9	Elevation handwheel on simulator.	Rotate. Observe that LOWER BEAM ELEVATION MILS dial on computer follows ANT EL MILS dial on simulator.	
10	TRIG PULSE OUTPUT.	Connect TRIG PULSE OUTPUT jack (J2708) to J107 on indicator unit. Set MASTER-SLAVE switch to SLAVE. *Observe* that indicator presentation is normal.	Para 23.

19. Monthly Preventive Maintenance Checks and Services

Sequence No.	Item	Procedure	Reference
1	Completeness of equipment.	Inspect equipment for completeness (appx III).	
2	Publications	Check to see that pertinent publications are available, complete, and in usable condition, without missing pages (DA PAM 310-4).	
3	Modification Work Orders.	Check DA PAM 310-4 to determine if new applicable MWO'S have been published.	
4	Transit case seal	Inspect transit case seal for leaks, or worn or loose edges.	
5	Mounting hardware . . .	See that all bolts, nuts, washers, handles, latches, and mounting hardware are present and properly tightened.	
6	Fuse	See that operating fuse is of the correct value.	
7	Interior surfaces	Clean dust, dirt, and grease from internal surfaces.	Para 20.
8	Pluckout items	Check seating of pluckout items.	

20. Cleaning

Inspect the interior and exterior of the equipment. All surfaces 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 is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.

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

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

Caution: Do not press on dial windows when cleaning; damage may result.

d. Clean the dial windows and the control knobs; use a soft clean cloth. If necessary, dampen the cloth with water; mild soap may be used to make the cleaning more effective.

e. Clean 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.

21. Lubrication

Routine lubrication of the equipment is not required. The synchro gear assemblies are lubricated by the manufacturer with Grease, Silicone Insulated Electric Motor (MIL-L-15719), and additional lubrication is required only after disassembly.

Section III. TROUBLESHOOTING

22. General

Troubleshooting of this equipment is based on the operational check contained in the daily preventive maintenance checks and services chart. To troubleshoot the equipment, perform all functions, starting with sequence No. 4, in the daily preventive maintenance and service chart (para 18) and proceed through the items until an abnormal condition or result is observed. Note the sequence number and turn to the corresponding number in the troubleshooting chart (para *23)*. Perform the checks and corrective actions indicated in the troubleshooting chart. If the corrective measures indicated do not result in correction of the t r o u b 1 e, higher echelon maintenance is required. Paragraphs 24 and 25 contain additional information and step-by-step instructions for performing equipment tests and repairs.

23. Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
4	*a*. Blown fuse indicator lights.	*a*. Defective fuse . .	*a*. Check fuse; replace as necessary (para 24a).
	b. SIM PWR ON indicator (DS2701) or one of the dial lights (DS2704, DS2705, or DS2706) fails to light.	*b*. Defective lamp . .	*b*. Check lamp for proper seating and replace if necessary (para 24).
5	SYNCHRO DATA PWR ON indicator light (DS2702) does not light.	Defective lamp. . . .	Check lamp for proper seating and replace if necessary (para 24b).
6	*a*. Azimuth strobe not present on indicator unit.	*a*. Defective tube V2806, V2807, or V2808.	*a*. Test tubes (para 25). Replace defective tube.
	b. No presentation on indicator unit.	*b*. Defective tubes V2801 through V2805.	*b*. Same as *a* above.
10	Abnormal presentation on indicator unit.	Defective tube V2101 or V2102.	Test tubes (para 25). Replace defective tube.

24. Repairs

a. *Replacement of Fuse.* Remove the fuse by turning the end of the fuseholder one-half turn counterclockwise and pulling outward. Remove the fuse and replace it with one of the same rating.

b. *Replacement of Indicator Lamps.*

(1) Turn the glass indicator jewel counterclockwise and pull it out to expose the defective lamp.

(2) Press in on the lamp and turn it counterclockwise to unlock it.

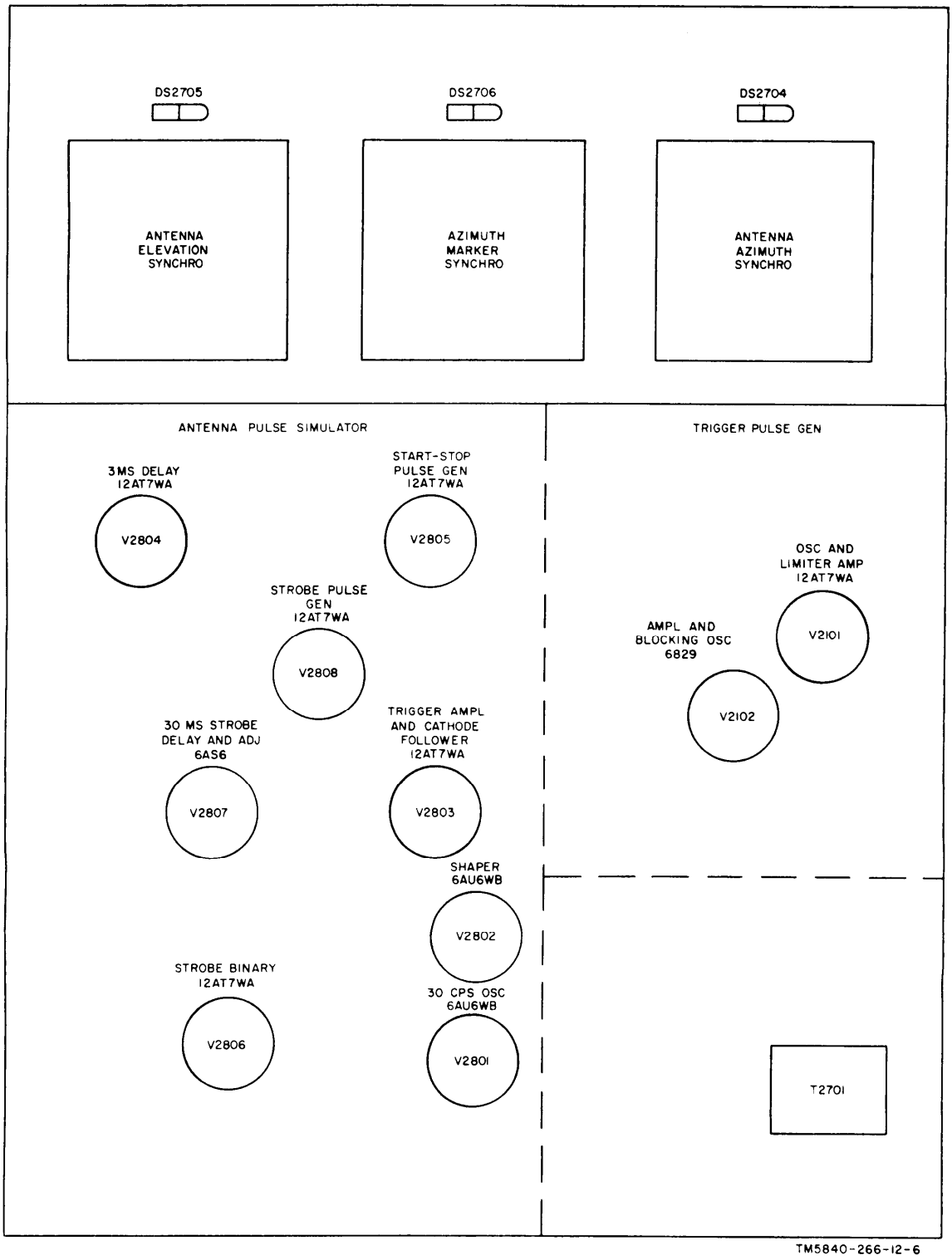

Figure 6. Location of tubes and dial lamps.

(3) Pull the defective lamp out and replace it with a new one. Push the lamp in and twist it clockwise to lock it.

c. Replacement of Dial Lamps.

(1) Loosen the eight captive screws that secure the panel to the case, and remove tie unit from the case.

(2) Remove the defective lamp (fig. 5) and replace it with a new one.

25. Tube-Testing Techniques

When trouble occurs, check all cabling and connections before removing any tubes. Try to isolate the trouble to a subassembly or stage. If tube failure is suspected, use the applicable procedure below to check the tubes.

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

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

b. Tube Substitution Method. Replace a suspected tube with a new tube. If the equipment still does not work, remove the new tube and put back the original tube. Repeat this procedure with each suspected tube until the defective tube is located.

c. Preferred-Type Tubes. All tubes used in the equipment are preferred-type tubes. Do not use nonpreferred types as replacements.

CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

26. General

The exact procedure for repackaging for shipment or limited storage depends on the material available and the conditions under which the equipment will be shipped or stored. Use the procedure outlined in paragraphs 27 and 28 whenever circumstances permit. The original packaging information, is given in paragraph 9.

27. Material Requirements

The following materials are required for packaging the simulator. For stock numbers of materials required, consult SB 38-100.

Material	Quantity
Corrugated carton (25 in. x 25 in. x 14 in.)	1
Gummed tape	6 ft
Waterproof paper	25 sq ft
Waterproof tape	10 ft
Cushioning material (2-in.-thick Resilo-Pak 200)	10 Sq ft
Plywood box (30 in. x 30 in. x 18 in.)	1

28. Packaging

Package the simulator as outlined below.

a. Install the cover on the simulator transit case and secure it in place with the latches.

b. Place the transit case in the corrugated carton and seal the carton with gummed tape.

c. Wrap the carton with waterproof paper and seal it with waterproof tape.

d. Place the wrapped carton in the plywood box. Cushion the carton within the box on all sides with the cushioning materials, and nail on the cover.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

29. Authority for Demolition

The demolition procedures given in paragraph 30 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.

30. 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 in what manner the destruction order will be carried out. In most cases, it is preferable to demolish completely some portions of the equipment rather than partially destroy the entire unit.

a. Smash. Smash the case and the subassemblies inside the case; use sledges, axes, hammers, crowbars, and any other heavy tools available.

b. Cut. Cut the cabling; use axes, handaxes, machetes, and similar tools.

c. Burn. Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, and similar tools. Burn the instruction literature first.

d. Dispose. Bury or scatter the destroyed parts.

APPENDIX I

REFERENCES

Following is a list of applicable references available to the organizational repairman of Simulator, Antenna Position SM-154/MPQ-4.

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.
TM 9-213	Painting Instructions for Field Use.
TM 11-5840-208-10	Operator's Manual; Radar Set AN/MPQ-4A.
TM 11-5840-208-30	Radar Set AN/MPQ-4A; Field Maintenance, Third Echelon.
TM 11-5840-208-45	Field (Fourth Echelon) and Depot Maintenance Manual; Radar Set AN/MPQ-4A.
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 38-750	The Army Equipment Record System and Procedures.

APPENDIX II

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies, a n d subassemblies 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 component.

(2) *Maintenance function*. This column indicates the various maintenance functions allocated to the echelons.

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

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

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

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

(e) Replace. To substitute serviceable components, assemblies, or subassemblies for unserviceable components, assemblies, or subassemblies.

(f) Repair. To restore an item to serviceable condition t h r o u g h correction of a specific failure or unserviceable condition. This function includes, but is not limited to, welding, grinding, riveting, straightening, and replacement of parts other than the trial-and-error replacement of running-spare-type items, such as fuses, lamps, or electron tubes.

(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 components of a weapons system.

(i) Overhaul. To restore an item to *completely serviceable* condition as prescribed by serviceability standards developed and published by heads of technical services. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(j) Rebuild. To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements, using original manufacturing tolerances and/or specifications a n d subsequent reassembly of the item.

(3) *lst, 2d, 3d, 4th, 5th echelons*. The symbol X indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that

level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.

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

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

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

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

(2) *lst, 2d, 3d, 4th, 5th echelon.* The dagger (†) indicates the echelons normally allocated the facility.

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

2. Maintenance by Using Organizations

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

Section II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHELON 1	2	3	4	5	TOOLS REQUIRED	REMARKS
SIMULATOR, ANTENNA POSITION SM-15- MPQ--A	service	X						
	adjust				X		12	
	inspect	X						
	test				X		1,2,3,4,5,6,7,9,10	All tests except those regarding Tool Code 8 and 11
						X	1,2,3,4,5,6,7,8,9,10, 11	
	repair				X		12	All repairs except synchro assemblies
						X	12	
	align					X	1,2,3,4,5,6,7,8,9,10, 11	
	calibrate				X		4,5,	
	overhaul					X	12,14	
CASE, COORDINATED DATA SIMULATOR	inspect		X				13	
	repair				X		12	

SM-15- MPQ--A

Section III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	ECHELON 1	2	3	4	5	TOOL CODE	REMARKS
[illegible]							
[illegible] TS- [illegible] U				+	+	1	
[illegible] METER AN/USM-[illegible]				+	+		
[illegible] F SIGNAL SL-[illegible] U				+	+		
[illegible] GENERATOR PU-[illegible] U				+	+	4	
[illegible] GENERATOR PU-[illegible]/MPM-[illegible]				+	+	5	
MULTIMETER TS-[illegible]/U				+	+	6	
[illegible]OSCOPE AN/USM-[illegible]				+	+	7	
[illegible] ERROR BRIDGE THETA Model [illegible] [illegible]-[illegible]-[illegible]					+	8	
TEST FACILITIES KIT MK-[illegible]/MPM-[illegible]				+	+	9	
[illegible] ELECTRON TUBE TV- [illegible] U				+	+	10	
TEST SET ELECTRON TUBE TV-[illegible] U					+	11	
TOOL KIT, RADAR AND RADIO REPAIRMAN TK-[illegible] U				+	+	12	
TOOL AND TEST EQUIPMENT NORMALLY AVAILABLE TO THE REPAIRMAN USER BECAUSE OF HIS ASSIGNED MISSION	+					13	
TOOL KIT SUPPLEMENTARY, RADAR RADIO REPAIR TK-[illegible] U					+	14	

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, 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

Columns are as follows:

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

b. Designation by Model. Not used.

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

d. 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.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. 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 Spare Items," the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

g. Illustration. The "Item No." column lists the reference symbols used for identification of the items in the illustration or text of the manual.

Section II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY IN UNIT	ILLUSTRATION FIG. NO.	ILLUSTRATION ITEM NO.
		SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A					
6625-864-6010		SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A: Uses electronic circuit system, uses mechanical gearing system syncro data output and pulse output; oper power reqt ac; 120v 400 cps single ph, 120v 400 cps single ph; dc 220v 0.075 amp					
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
		SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A: (BASIC COMPONENT)		NX	1		
ORD THRU AGC		TECHNICAL MANUAL TM 11-6625-541-12			2		
6625-892-3849		CASE, COORDINATED DATA SIMULATOR: case for spare parts for SM-154/MPQ-4A; Gen Elec Part 7830289P009		NX	1		
		RUNNING SPARE ITEMS					
		SIMULATOR, ANTENNA POSITION SM-154/MPQ-4A					
		ANTENNA PULSE SIMULATOR GROUP					
5960-681-9802		ELECTRON TUBE: MIL type 6AU6WB			1		V2801 V2802
5960-262-0167		ELECTRON TUBE: MIL type 12AT7WA Item Nos: V2803 thru V2806 V2808			2		See desc column
5960-237-9937		ELECTRON TUBE: MIL type 5725/6AS6W			1		V2807
		ELEVATION POSITION GROUP					
5905-281-0244		FUSE, CARTRIDGE: MIL type F02A250V1/2AS			5		F2701
6240-223-9106		LAMP, GLOW: Gen Elec Co. Part NE-51			1		DS2701 DS2702 DS270[illegible]
6240-583-9616		LAMP, INCANDESCENT: G.E. Type 1847			2		DS2704 DS2705 DS270[illegible]
		TRIGGER PULSE GENERATOR GROUP					
5960-262-0167		ELECTRON TUBE: MIL type 12AT7WA			1		V2101
5960-581-8088		ELECTRON TUBE: MIL type 6829			1		V2102

By Order of 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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ARADCOM Rgn (2)
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OS Base Comd (9)
LOGCOMD (2)
USAECOM (5)
USAMICOM (8)
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MDW (1)
Armies (2)
Corps (2)
USA Corps (8)
USATC AD (2)
USATC Engr (2)
USATC Inf (2)
USATC Armor (2)
Instls (2) except
Ft Monmouth (63)
Svc College (2)
Br Svc Sch (2)
GENDEP (OS) (2)
Sig Dep (OS) (12)
Sig Sec, GENDEP (5)
Army Dep (2) except
Ft Worth (8)
Lexington (12)
Sacramento (28)
Tobyhanna (12)
CofSptS (1)
USA Elct RD Actv, White Sands (13)
USA Elct RD Actv, Ft. Huachuca *(2)*
USA Trans Tml Comd (1)
Army Tml (1)
POE(1)
USAOSA (1)
AMS (1)
WRAMC (1)
AFIP (1)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
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DCA (1)
DLSC (1)
Units org under fol TOE:
(2 copies each)
11-7
11-16
11-57
11-98
11-117
11-155
11-157
11-500 *(AA-AC)* (RM-RU)
11-557
11-587
11-SW
11-597

NG: State AG (3); Units--Same as Active Army except allowance is one copy for each unit.
USAR: None.
For explanation of abbreviations used, see AR 820-50.