

TECHNICAL MANUAL

GS AND DEPOT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

TELEPHONE

TEST SET

TS-716/U

HEADQUARTERS,DEPARTMENT OF THE ARMY

SEPTEMBER 1971

**GS and Depot Maintenance Manual
Including Repair Parts and Special Tools List
TELEPHONE TEST SET TS-716/U**

		Paragraph	Page
CHAPTER 1.	INTRODUCTION		
	Scope -----	1-1	1-1
	Indexes of publications -----	1-2	1-1
2.	FUNCTIONING OF EQUIPMENT		
	General -----	2-1	2-1
	Block diagram -----	2-2	2-1
	Noise generator assembly 1A3A3 -----	2-3	2-2
	Power amplifier assembly 1A3A4 -----	2-4	2-2
	Preamplifier assembly 1A3A1 -----	2-5	2-3
	Meter amplifier assembly 1A3A2 -----	2-6	2-3
	Ring generator assembly 1A3A8 -----	2-7	2-3
	Transmission efficiency assembly 1A3A -----	2-8	2-4
	Dial percent break assembly 1A3A9 -----	2-9	2-4
	Dial speed assembly 1A3A10 -----	2-10	2-5
	Positive power supply assembly 1A3A -----	2-11	2-5
	Negative power supply assembly 1A3A6 -----	2-12	2-5
3.	TROUBLESHOOTING		
	General instructions -----	3-1	3-1
	Test equipment required -----	3-2	3-1
	Troubleshooting chart -----	3-3	3-2
	Voltage measurements -----	3-4	3-21
	Resistance measurements of plug-in assemblies -----	3-5	3-23
	Dc resistance of transformers and coils -----	3-6	3-24
4.	REPAIRS AND ALIGNMENT		
	General parts replacement techniques -----	4-1	4-1
	Test equipment required for alignment -----	4-2	4-1
	Acoustic output adjustment 1A3R11 -----	4-3	4-1
	Meter amplifier gain adjustment 1A3R16 -----	4-4	4-1
	Microphone equalization adjustment 1A2A14R2 -----	4-5	4-2
	Dial speed adjustment A3R15 -----	4-6	4-2
	Noise generator load driver adjustment 1A3R9 -----	4-7	4-2
5.	SHIPMENT AND LIMITED STORAGE		
	Disassembly of equipment -----	5-1	5-1
	Repackaging for shipment or limited storage -----	5-2	5-1
6.	DEPOT OVERHAUL STANDARDS		
	Applicability of depot overhaul standards -----	6-1	6-1
	Applicable references -----	6-2	6-1
	Test equipment required for depot testing -----	6-3	6-1
	General test requirements -----	6-4	6-1
	Sound source supply test -----	6-5	6-2
	Driver impedance test -----	6-6	6-2
	Driver distortion test -----	6-7	6-2
	Coupler-microphone distortion test -----	6-8	6-2
	Microphone preamplifier frequency response and gain test -----	6-9	6-3
	Microphone preamplifier distortion test -----	6-10	6-4
	Meter amplifier gain test -----	6-11	6-4
	Meter scale test -----	6-12	6-4
	Circuit tests requirements -----	6-13	6-4
	Insulation resistance test -----	6-14	6-5
	Continuity test -----	6-15	6-5
	Hand generator test -----	6-16	6-5
	Ringer test -----	6-17	6-5

		Paragraph	Page
CHAPTER	6.	Dial speed test -----6-18	6-6
		Dial percent break test -----6-19	6-6
		Driver frequency response test-----6-20	6-6
		Coupler microphone frequency response test-----6-21	6-7
APPENDIX	A.	REFERENCES-----	A-1
	B.	GENERAL SUPPORT AND DEPOT MAINTENANCE REPAIR	
		PARTS AND SPECIAL TOOLS LIST -----	B-1

CHAPTER 1 INTRODUCTION

1-1. Scope

a. This manual contains general support (GS) and depot maintenance instructions for Telephone Test Set TS-716/U (test set) (FIG. 1-1). It includes instructions appropriate to GS and depot for troubleshooting, testing, aligning, and repairing the equipment. It also lists tools, materials, and test equipment required and contains a repair parts list (app B).

b. The complete technical manual for this equipment includes TM 11-6625-596-12 and TB 11-6625-596-12/1.

c. Appendix B is current as of 21 June 1971.

d. 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: Commanding

General, U. S. Army Electronics Command ATTN: AMSEL-ME-NMP-EM, Fort Monmouth, N.J. 07703.

NOTE

**For applicable forms and records,
see TM 11-6625-596-12.**

1-2. 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 the latest issue of DA Pam 310-7 to determine whether there are modification work orders (MWO's) applicable to the equipment.

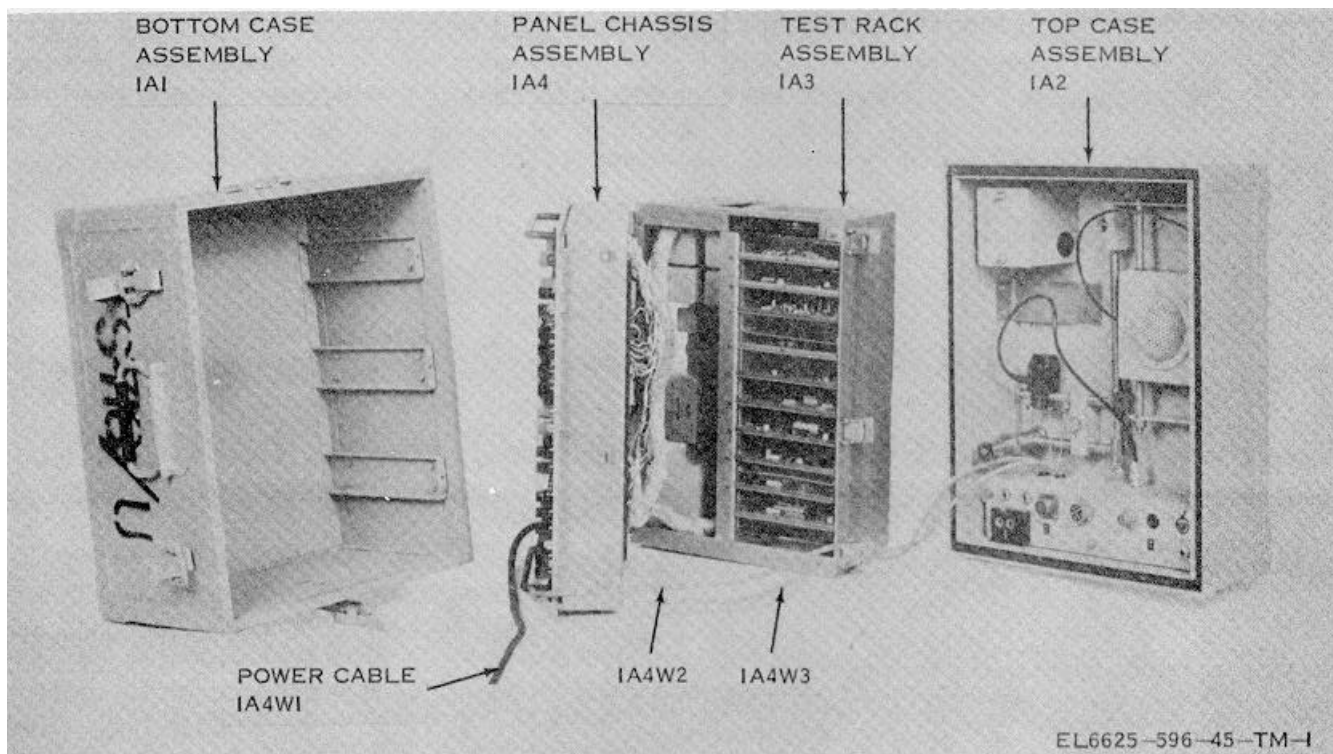


Figure 1-1. Telephone Test Set TS-716/U.

CHAPTER 2

FUNCTIONING OF EQUIPMENT

2-1. General

a. Telephone Test Set TS-716/U (FIG. 1-1) is designed to perform eight different types of tests on all types of transducers and telephone communications equipment. To perform such a wide variety of functions, the test set consists of a number of separate circuits and assemblies which are selected and interconnected by pushbutton and rotary switches.

b. The TB-716/U tests equipment in one or more of the following ways:

(1) By applying a known input signal, either electrical or acoustical, to the equipment under test, and measuring either the electrical or acoustical output of the equipment under test.

(2) By applying an input to the equipment under test which simulates its normal operating condition.

(3) By measuring the output of the equipment under test.

(4) By comparing the equipment under test to a standard circuit in the test set.

2-2. Block Diagram

Figure 6-8 is a simplified block diagram of the TS-716/U. The location of the various controls, circuits, connectors, and assemblies is shown in figures 3-1 through 3-4.

a. *Noise Generator.* Noise generator assembly 1A3A3 produces a random noise signal, with harmonics, that covers the frequency spectrum from 300 to 5, 100 Hertz (Hz).

b. *Power Amplifier.* Power amplifier assembly 1A3A4 raises the output of the noise generator to a nominal level of 1 watt. The power amplifier output is applied to a resistive load and to either test loudspeaker 1A2A2 or to NOISE GEN terminals 1A4E12 and ARTIFICIAL MICROPHONE terminal 1A4E as selected by NOISE GENERATOR switch 1A4S3. The power amplifier may also be applied to EARPHONES panel terminal 1A4E8. RECEIVER LOAD switch 1A4S2 selects the proper resistor network to match the

impedance of the earphone being tested.

c. *Microphone.* Test microphone 1A2A4A4 measures the acoustical output from a receiver to which a known electrical input has been applied from the power amplifier. The output of the test microphone is coupled to LEVEL control A4AT1 by input transformer 1A4T2 when TEST CONDI-TION switch 1A4S9 is at COUPLER. With 1A4S9 at ART REC or TEL LINE, 1A4T2 is connected to the MICROPHONES panel terminals. MICROPHONE LOAD switch 1A4S2 selects the correct tap on the primary winding of 1A4T2 to match the impedance of the microphone being tested.

d. *LEVEL Controls A and B.* LEVEL controls A (1A4AT1) and B (1A4AT2) are decade ladder type variable attenuators providing a total attenuation of 0 to 110 decibels (dB) in 1-dB steps. The LEVEL attenuators control the input to preamplifier 1A3A1 so that a midscale reading of meter 1A4M1 can always be obtained, regardless of the sensitivity of the microphone or receiver being tested.

e. *Preamplifier.* Microphone preamplifier 1A3A1 provides a fixed gain of 60 dB to raise the level of the weak signals from the microphone ahead of the switching and filter circuits.

f. *Filters.* Filters 1A3FL1 through 1A3FL4 divide the output of the preamplifier into four frequency bands. By measuring the electrical energy in each band, it is possible to determine the frequency response characteristic of a micro-phone or receiver.

g. *VALUE Controls C and D.* Since the output of a microphone is usually not uniform but increases as frequency increases, VALUE controls 1A4AT3 and 1A4AT4 are placed between the CENTER (1A3FL2) and HIGH (1A3FL3) filters and meter amplifier 1A3A2 to provide additional attenuation in these frequency bands.