

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

---

OPERATOR, ORGANIZATIONAL, DIRECT  
SUPPORT, GENERAL SUPPORT, AND DEPOT  
MAINTENANCE MANUAL INCLUDING REPAIR  
PARTS AND SPECIAL TOOL LISTS

MEASURING SET, ENVELOPE DELAY

DISTORTION TS-2669/GCM



HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1969

**OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT,  
 AND DEPOT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND  
 SPECIAL TOOL LISTS**

**MEASURING SET, ENVELOPE DELAY DFSTORTION TS-2669/GCM**

		Paragraph	Page
CHAPTER 1.	INTRODUCTION		
Section I.	General		
	Scope .....	1-1	1-1
	Indexes of publications.....	1-2	1-1
	Forms and records.....	1-3	1-1
	II. Description and data		
	Purpose and use.....	1-4	1-1
	New term for cycles per second .....	1-5	1-1
	Technical characteristics.....	1-6	1-2
	Components of TS-2669/GCM.....	1-7	1-2
	Description.....	1-8	1-2
CHAPTER 2.	INSTALLATION		
	Unpacking.....	2-1	2-1
	Checking unpacked equipment .....	2-2	2-1
	Installation of equipment.....	2-3	2-1
CHAPTER 3.	OPERATING INSTRUCTIONS		
	Controls, indicators, and jacks.....	3-1	3-1
	Modes of operation .....	3-2	3-3
	General operating procedures.....	3-3	3-4
	End-to-end operating mode.....	3-4	3-9
	End-to-end with return reference mode .....	3-5	3-10
	Loop mode.....	3-6	3-10
	Operation under unusual conditions .....	3-7	3-10
CHAPTER 4.	ORGANIZATIONAL MAINTENANCE		
Section I.	Preventive maintenance		
	Scope of maintenance .....	4-1	4-1
	Operator's daily preventive maintenance checks and services chart .....	4-2	4-1
	Organizational monthly preventive maintenance checks and services chart.....	4-3	4-2
	Organizational quarterly preventive maintenance checks and services chart ....	4-4	4-2
	II. Troubleshooting, repair, and adjustment		
	General.....	4-5	4-4
	Organizational troubleshooting.....	4-6	4-4
	Repair procedures.....	4-7	4-5
CHAPTER 5.	FUNCTIONING OF EQUIPMENT		
	Transmission distortion .....	5-1	5-1
	Concept of envelope delay.....	5-2	5-1
	Delay measurement.....	5-3	5-1
	Block diagram analysis .....	5-4	5-1
	Description of logic .....	5-5	5-3
	Integrated circuits.....	5-6	5-7
	Circuit descriptions.....	5-7	5-9
CHAPTER 6.	GENERAL SUPPORT MAINTENANCE		
Section I.	General Support Troubleshooting		
	General.....	6-1	6-1
	Localization procedures .....	6-2	6-1
	Isolation procedures.....	6-3	6-1
	II. Repair and testing		
	Removal and replacement procedures.....	6-4	6-2
	Repair procedures.....	6-5	6-2
	Adjustments after repair.....	6-6	6-2

		Paragraph	Page
	Calibration .....	6-7	6-3
	Final test procedures.....	6-8	6-4
CHAPTER	7. DEPOT OVERHAUL STANDARDS		
	Applicability of depot overhaul standards .....	7-1	7-1
	Applicable references.....	7-2	7-1
	Test facilities required.....	7-3	7-1
	Test procedures .....	7-4	7-1
CHAPTER	8. SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE		
	Section I. Shipment and limited storage		
	Disassembly of equipment .....	8-1	8-1
	Repackaging for shipment or limited storage.....	8-2	8-1
	II. Demolition of materiel to prevent enemy use		
	Authority for demolition .....	8-3	8-1
	Methods of destruction.....	8-4	8-1
CHAPTER	9. ILLUSTRATIONS		
	General.....	9-1	9-1
	List of illustrations .....	9-2	9-1
APPENDIX	A. REFERENCES .....		A-1
	B. BASIC ISSUE ITEMS .....		B-1
	C. MAINTENANCE ALLOCATION.....		C-1
	D. ORGANIZATIONAL, DS, GS, AND DEPOT REPAIR PARTS .....		D-1

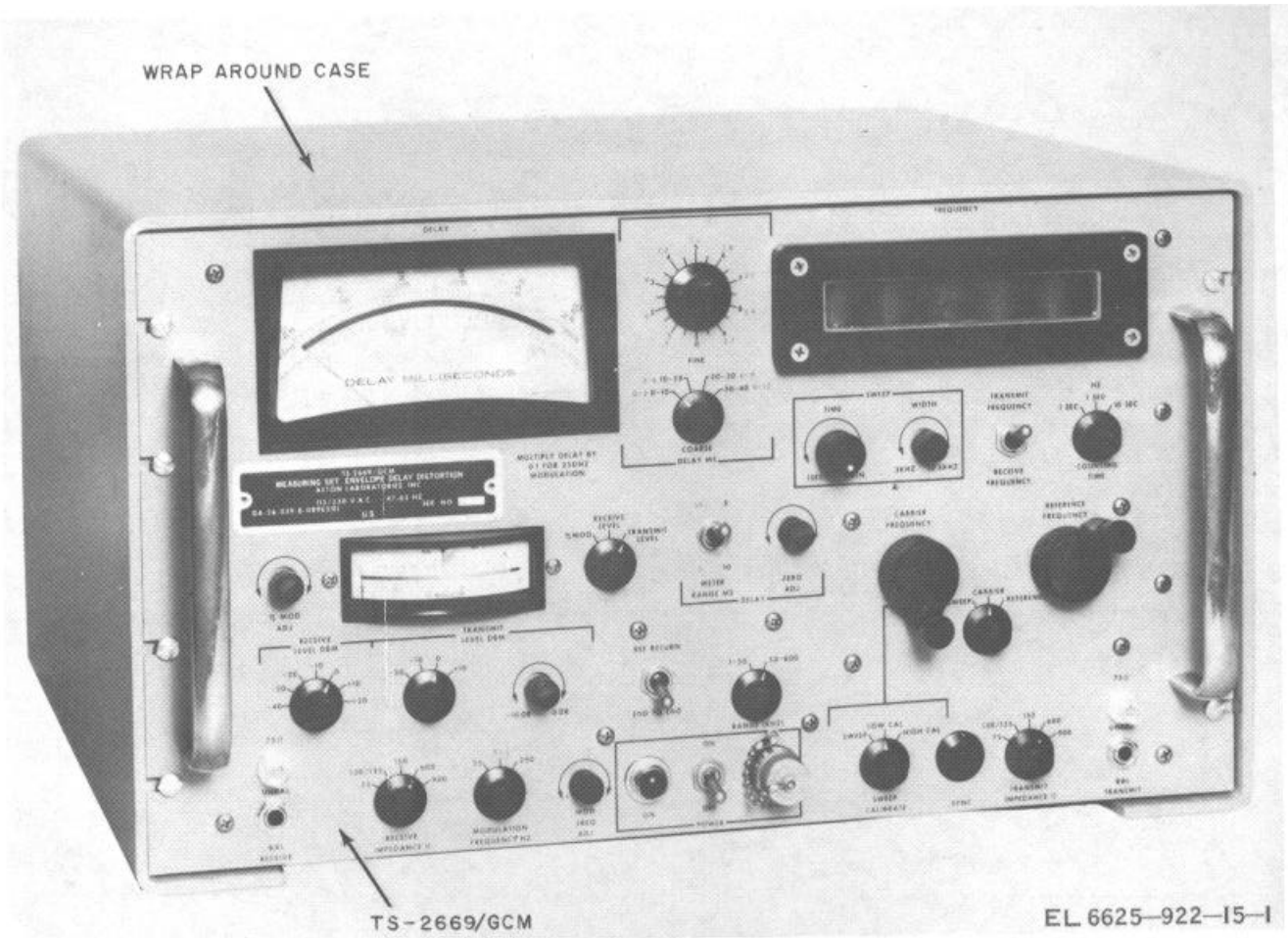


Figure 1-1. Measuring Set, Envelope Delay Distortion TS-2669/GCM.

**CHAPTER 1  
INTRODUCTION**

**Section I. GENERAL**

**1-1. Scope**

a. This manual describes Measuring Set, Envelope Delay Distortion TS-2669/GCM (fig. 1-1), its installation, operation, functioning, repair, and adjustment. It includes instructions for troubleshooting, testing, aligning, and repairing the equipment.

b. A basic issue items list is in appendix B. A maintenance allocation chart is in appendix C. Repair parts are listed in appendix D.

c. Appendixes B, C, and D are current as of 29 January 1969.

**1-2. Indexes of Publications**

a. *DA Pam 310-4.* Refer to DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the TS-2669/GCM.

b. *DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the TS-2669/GCM.

**1-3. 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 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 Publication 378 (Navy), AFR 71-4 (Air Force), and MCO P 4610-5 (Marine Corps).

c. *Discrepancy in Shipment Report (DISREP) (SF361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF361) as prescribed in AR 55-38 (Army), NAVSUP Pub 459 (Navy), AFM 75-34 (Air Force), and MCO P4610.19 (Marine Corps).

d. *Reporting of Equipment Manual Improvements.* Report of errors, omissions, and recommendations for improving this equipment manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to the Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-ME-NMP-AD, Fort Monmouth, N.J. 07703.

**Section II. DESCRIPTION AND DATA**

**1-4. Purpose and Use**

The TS-2669/GCM is used to test and measure envelope delay characteristics of voice frequency and data communication networks. It is capable of providing accurate delay and attenuation measurements in the frequency range of 100 Hertz (Hz) to 552 kilohertz (kHz). The TS-2669/ GCM was designed specifically for use with standard telephone lines, group equipment, and

supergroup equipment. It can also be used with active and passive networks, filters, and equalizers.

**1-5. New Term for Cycles Per Second**

The National Bureau of Standards has officially adopted the term HERTZ for cycles per second. The following chart provides the common equivalents.

Unit/Quantity	Old term	Old abbrev	New term	New abbrev
Frequency 10 <sup>-3</sup> cycles per second	Cycles per second Millicycles per second	cps mc	Hertz Millihertz	Hz mHz