

TECHNICAL MANUAL
GENERAL SUPPORT MAINTENANCE MANUAL
SIGNAL GENERATORS
AN/URM-52
(NSN 6625-00-556-8107)
AN/URM-52A
(NSN 6625-00-592-5742)
AN/URM-52B
(NSN 6625-00-965-1501)

**GENERAL SUPPORT
 MAINTENANCE MANUAL
 FOR
 SIGNAL GENERATORS AN/USM-52 (NSN 6625-00-556-8107)
 AN/URM-52A (NSN 6625-00-592-5742) AN/URM-52B (NSN 6625-00-965-1501)**

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 (Test) located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

If there are no blank DA Forms 2028-2 (Test) in the back of your manual, use the standard DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to the Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, New Jersey 07703.

In either case a reply will be furnished direct to you.

		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
	Administrative storage	1-4	1-1
	Destruction of Army electronics materiel	1-5	1-1
	Reporting equipment improvement recommendations (EIR)	1-6	1-1
	II. Description and data		
	Purpose and use.....	1-7	1-1
	Description	1-8	1-1
	Tabulated data	1-9	1-1
CHAPTER	2. FUNCTIONING OF EQUIPMENT		
	Functional description of Signal Generator AN/URM-52(*)	2-1	2-1
	Electronic function, rf oscillator	2-2	2-1
	Electronic function, output attenuator assembly and power monitoring system.....	2-3	2-5
	Electronic function, synchronizing and modulator circuits	2-4	2-8
CHAPTER	3. GENERAL SUPPORT MAINTENANCE INSTRUCTIONS		
Section	I. General		
	Introduction	3-1	3-1
	Tools and equipment	3-2	3-1
	II. Troubleshooting		
	Troubleshooting procedures	3-3	3-1
	Performance standards	3-4	3-2
	Voltage and resistance measurements	3-5	3-2
	Detailed troubleshooting.....	3-6	3-3
	Waveform analysis	3-7	3-4
	Tube failures	3-8	3-9
	Tube complement.....	3-9	3-10

*This manual supersedes so much of TM 11-6625-214-24, 14 October 1960, including all changes, as pertains to general support.

SECTION		Paragraph	Page
	III. Maintenance Instructions		
	Cleaning.....	3-10	3-14
	Lubrication	3-11	3-14
	Painting	3-12	3-14
	Repairs and replacement techniques	3-13	3-14
	Removing V114 klystron tube	3-14	3-14
	Installing new V114 klystron tube	3-15	3-17
	Adjustments following replacement of V114.....	3-16	3-17
	Removing attenuator probe assembly	3-17	3-17
	Replacing attenuator probe assembly	3-18	3-19
	Removing power monitoring probe assembly.....	3-19	3-19
	Replacing power monitoring probe assembly.....	3-20	3-19
	Removing repeller tracking potentiometer R174	3-21	3-19
	Replacing repeller tracking potentiometer R174.....	3-22	3-21
	Tube replacement and necessary adjustments	3-23	3-22
	IV. General support testing procedures		
	General	3-24	3-23
	Tools and test equipment	3-25	3-23
	External pulse synchronization check.....	3-26	3-23
	External sine wave synchronization check	3-27	3-25
	External pulse modulation check.....	3-28	3-27
	External frequency modulation check.....	3-29	3-29
	Internal frequency modulation check.....	3-30	3-31
	Pulse shape of output synchronizing pulses-check.....	3-31	3-33
APPENDIX	REFERENCES		A-1

List of Illustrations

Figure No.	Title	Page
2-1	Block diagram, Signal Generator AN/URM-52(*)	2-1
2-2	Equivalent circuit of rf oscillator.....	2-2
2-3	Cutaway view of rf oscillator.....	2-3
2-4	Plot of repeller voltage versus frequency	2-4
2-5	Simplified schematic diagram of klystron repeller voltage tracking circuit	2-5
2-6	Cutaway view of attenuator probe.....	2-6
2-7	Cutaway view of power monitor probe	2-6
2-8	Simplified schematic diagram of power monitor circuit	2-7
2-9	Block diagram of modulator circuits	2-8
2-10	Simplified schematic diagram of basic sync-input circuits	2-10
2-11	Simplified schematic diagram of basic pulse rate multivibrator, external sync-condition.....	2-11
2-12	Simplified schematic diagram of basic pulse rate multivibrator free-running condition.....	2-12
2-13	Simplified schematic diagram of pulse shaping multivibrator and sync-out cathode follower.....	2-13
2-14	Simplified schematic diagram of pulse amplifier and pulse delay multivibrator	2-14
2-15	Simplified schematic diagram of thyatron pulse shaper circuit	2-15
2-16	Simplified schematic diagram of pulse width multivibrator.....	2-16
2-17	Simplified schematic diagram of klystron modulator circuit, AN/URM-52	2-17
2-18	Simplified schematic diagram of klystron modulator circuit, AN/URM-52A.....	2-18
2-19	Simplified schematic diagram of delayed sync-out pulse shaping multivibrator and cathode follower.....	2-19
2-20	Simplified schematic diagram of internal frequency modulation circuits	2-20
3-1	Location of tubes, TS-621/U, TS-621A/U, TS-621B/U, and TS-621C/U.....	3-10
3-2	Location of tubes and diodes, SG-557/U	3-11
3-3	Signal Generator AN/URM-52(*) in position for klystron replacement	3-15
3-4	Klystron assembly, exploded view	3-16
3-5	Attenuator and power monitoring probe drive assembly.....	3-18
3-6	Frequency control assembly, Signal Generator AN/URM-52, bottom view.....	3-20
3-7	Frequency control assembly, Signal Generator AN/URM-52A, bottom view	3-21
3-8	External pulse synchronization check, test setup.....	3-23
3-9	External sine wave synchronization check test setup	3-25
3-10	External pulse modulation check, test setup.....	3-27
3-11	External frequency modulation check, test setup.....	3-29
3-12	Internal frequency modulation check, test setup	3-31
3-13	Pulse shape of output synchronizing pulses-check, test setup.....	3-34

Figure No

Title

Page

FO-1	Color code markings for MIL-STD resistors, inductors, and capacitors	
FO-2	Signal Generator TS-621/U pulser and rf oscillator sections, schematic diagram	
FO-3	Signal Generator TS-621A, B/U Pulser and rf oscillator sections. schematic diagram.....	
FO-4	Signal Generator TS-621C/U putser and rf oscillator sections, schematic diagram	
FO-5	Signal Generator SG-557/U pulser and rf oscillator sections, schematic diagram	
FO-6	Signal Generator TS-621/U power supply section, schematic diagram.....	
FO-7	Signal Generator TS-621A, B/U power supply section, schematic diagram	
FO-8	Signal Generator TS-621C/U power supply section, schematic diagram	
FO-9	Signal Generator SG-557/U power supply section, schematic diagram	
FO-10	Tube socket voltage measurements for Signal Generators TS-621,A,B/U.....	
FO-11	Tube socket voltage measurements for Signal Generator SG-557/U.....	
FO-12	Tube socket resistance measurements for Signal Generator AN/URM-52(*)	

List of Tables

Table Number

Title

Page

3-1	Performance standards	3-2
3-2	Troubleshooting.....	3-3
3-3	waveform analysis.....	3-5
3-4	Tube and diode complement.....	3-12
3-5	External pulse synchronization check	3-24
3-6	External sine wave synchronization check.....	3-26
3-7	External pulse modulation check	3-28
3-8	External frequency modulation check	3-30
3-9	Internal frequency modulation check.....	3-32
3-10	Pulse shape of output synchronizing pulses check.....	3-34

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual presents a functional description of Signal Generators AN/URM-52, AN/URM-52A, and AN/URM-52B. It gives general support maintenance instructions for the equipment and includes instructions for troubleshooting, testing, and repair. For consistency throughout this manual, Signal Generators AN/URM-52, AN/URM-52A and AN/URM-52B will be referred to as the AN/URM-52(*), except where model differences dictate.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to 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.

1-3. Forms and Records.

a. Reports of Maintenance of Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all 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/NAVSUPINST4030.29/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/AFR 75- 18/MCO P4610.19B. and DSAR 4500.15.

1-4. Administrative Storage

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

1-5. Destruction of Army Electronics Materiel

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

1-6. Reporting Equipment Improvement Recommendations (EIR)

EIRs will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIRs are provided in TM 38-750, The Army Maintenance Management System. EIRs should be mailed directly to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, New Jersey 07703. A reply will be furnished directly to you.

Section II. DESCRIPTION AND DATA

1-7. Purpose and Use

The AN/URM-52(*) is a complete, self-contained signal generator. For a list of accessories applicable to each model of equipment, refer to TM 11-6625-214-12. The equipment is designed for use in testing radar and for other applications requiring small amounts of rf power, such as measuring standing wave ratios, antenna characteristics, transmission line characteristics, conversion gain, alignment and calibration of receivers, and similar uses.

1-8. Description

For a general description of the AN/URM-52(*), refer to TM 11-6625-214-12.

1-9. Tabulated Data

For performance characteristics of the AN/URM- 52(*), refer to tabulated data contained in TM 11- 6625-214-12.