# TM 11–6625-2610–40

TECHNICAL MANUAL

GENERAL SUPPORT MAINTENANCE MANUAL

# RADAR TEST SET AN/TPM-25A
# (NSN 6625-01-045-9988)

HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1979

TECHNICAL MANUAL
NO. 11–6625–2610–40

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *10 AUGUST 1979*

# GENERAL SUPPORT MAINTENANCE MANUAL

# RADAR TEST SET AN/TPM - 25A
# (NSN 6625-01-045-9988)

## REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 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 in the back of your manual, use the standard DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to the Commander, U.S. Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

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


| | | Page |
|---|---|---|
| CHAPTER 1. | INTRODUCTION | 1-1 |
| CHAPTER 2. | FUNCTIONING OF EQUIPMENT | |
| Section I. | Overall Functional Description | 2-1 |
| II. | Functional Description | 2-1 |
| III. | Block Diagram Discussion | 2-16 |
| IV. | Detailed Description | 2-19 |
| CHAPTER 3. | GENERAL SUPPORT MAINTENANCE | |
| Section I. | General | 3-1 |
| II. | Troubleshooting | 3-3 |
| III. | Removal and Replacement | 3-39 |
| IV. | Adjustment and Alignment | 3-48 |
| V. | Repair | 3-64 |
| VI. | General Support Test Procedures | 3-64 |
| APPENDIX A | REFERENCES | A-1 |
| INDEX | | Index-1 |


## LIST OF ILLUSTRATIONS


| *Fig. No.* | *Title* | *Page No.* |
|---|---|---|
| 2-1 | Test Set Input and Output Connection Diagram | 2–2 |
| 2-1 | SIF Fixed Frequency, Simplified Block Diagram (Sheets 1 through 3) | 2–4 |
| 2-3 | SIF Fixed Frequency Trigger Timing | 2–7 |
| 2-4 | Mode 4 Fixed Frequency, Simplified Block Diagram (Sheets 1 and 2) | 2–9 |
| 2-5 | Mode 4 Fixed Frequency Trigger Timing | 2–11 |
| 2-6 | Mode 4 fixed Frequency Trigger Timing (DCD) | 2–12 |
| 2-7 | Swept Freequency, Simplified Block Diagram | 2–14 |
| 2-8 | Transmitter Frequency Measurement Oscilloscope Display | 2–15 |
| 2-9 | Receiver Bandwidth Measurement Oscilloscope Display | 2–16 |
| 2-10 | Typical SIF Reply Trains | 2–25 |
| 2-11 | SIF and Mode 4 Reply Generator, Mode 4 Jamming Trigger Generator, Logic Diagram | 2–29 |
| 2-12 | Secondary Phase Lock Loop (A11A2A2). Block Diagram | 2–30 |
| 2-13 | Primary Phase Lock Loop (A11A2A1), Block Diagram | 2–31 |
| 2-14 | Pulse Width Discriminator Timing Diagram for MODE 1 Interrogations | 2–33 |
| 3-1 | Test Point Location Diagram | 3–5 |
| 3-2 | Test Set Chassis (Showing Main Assemblies), Partial Exploded View | 3–42 |

## LIST OF ILLUSTRATIONS — Continued


| *Fig. No.* | *Title* | *Page* No. |
|---|---|---|
| 3–3 | Test Set Chassis (Showing Rf Bit/Mixer A15), Partial Exploded View | 3–43 |
| 3–4 | Test Set Chassis(Showing Circuit Cards), Partial Exploded View | 3–46 |
| 3–5 | Test Set, Overall View | 3–47 |
| 3–6 | Adjustment Location Diagram (Sheets l and 2) | 3–48 |
| 3–7 | Power Supply Adjustment Setup | 3–51 |
| 3–8 | Reply Pulse Width Adjustment Setup | 3–52 |
| 3–9 | Circuit Card A9 Switch, Location Diagram | 3–53 |
| 3–10 | Rf GeneratorAdjustment Setup. | 3–55 |
| 3–11 | Power Measurement Adjustment Setup | 3–58 |
| 3–12 | PRF Input MeasurementAdjustment Setup | 3–60 |
| 3–13 | Reply Nominal Delay and SIF Pretrigger Delay Adjustment Setup | 3–61 |
| 3–14 | Circuit Card AI Switch, Location Diagram | 3–62 |
| 3–15 | Adjustment Waveforms | 3-63 |
| 3–16 | Power Supply Test Setup | 3–67 |
| 3–17 | Radar Trigger and Scope Trigger Characteristics Test Setup.... | 3–68 |
| 3–18 | SIF Pretrigger Characteristics and Timing Test Setup | 3–70 |
| 3–19 | External Gating Test Setup. | 3-71 |
| 3–20 | External Modulation Test Setup. | 3–73 |
| 3–21 | Timing Markers Test Setup | 3-75 |
| 3–22 | 30 KHz Test Setup | 3–76 |
| 3–23 | Interleave Test Setup | 3–77 |
| 3–24 | BIT Frequency Self-Test Setup. | 3–78 |
| 3–25 | Delayed Rf SweepTrigger and Sweep Frequency Mode PRF Countdown Test Setup | 3–79 |
| 3–26 | Decode Test Setup | 3–82 |
| 3–27 | SIF ChallengeVideoTestSetup. | 3–84 |
| 3–28 | Pulse Repetition Test Setup... | 3–85 |
| 3–29 | Pulse Repetition Measurement Test Setup | 3–88 |
| 3–30 | External Trigger Input Test Setup | 3–90 |
| 3–31 | Range Delay Test Setup | 3–94 |
| 3–32 | SIF Reply and Substitute Pulse Spacing, and Mode 4 Reply Test Setup | 3–98 |
| 3–33 | Variable Gating Test Setup.... | 3–102 |
| 3–34 | Mode 4 Challenge Video Test Setup | 3-103 |
| 3–35 | Mode 4 GTC TriggerTest Setup | 3-104 |
| 3–36 | Rf Output FrequencyTest Setup | 3-109 |
| 3–37 | Rf Output Power Test Setup... | 3–111 |
| 3–38 | Modulator and Demodulator Test Setup | 3–113 |
| 3–39 | Rf Input Power Test Setup | 3–117 |
| 3–40 | Rf Input Frequency Measurement Test Setup | 3–121 |
| FO–1 | MIL-STD Color Code Markings (Sheets l and 2) | Foldouts are |
| FO–2 | Test Set, Block Diagram | atthereof |
| FO–3 | Prt and Delay Generator, Logic Diagram (Sheets l through 4) | this rnanual |
| FO–4 | Output Triggers and Mode 4 Challenge Generator, Logic Diagram | |
| FO–5 | SXF and Mode 4 Reply Generator, Simplified Block Diagram | |
| FO–6 | SIF and Mode 4 Reply Generator Pulse Position Shift Register, Logic Diagram | |
| FO–7 | SIF and Mode 4 Reply Generator SIF Coder, Logic Diagram | |
| FO–8 | SIF and Mode 4 Reply Generator Sub Pulse Gates and M4 Jamming in SIF; Logic Diagram | |
| FO–9 | SIF and Mode 4 Reply Generator Sub Pulse Fixed Position Generator, Logic Diagram. | |
| FO–10 | SIF and Mode 4 Reply Generator Sub Pulse Sliding Position Generator, Logic Diagram | |
| FO–11 | SIF and Mode 4 Reply Generator Reply Video Drivers, Logic Diagram | |
| FO–12 | Mode4 Fixed Target Generator, Logic Diagram | |
| FO–13 | SIF and Mode 4 Reply Generator M4 Jamming in Mode 4, Logic Diagram | |
| FO–14 | Rf Signal Generator, Block Diagram (Sheets land 2) | |
| FO–15 | Receiver, Block Diagram(Sheets land 2) | |
| FO–16 | Measurement Section, Logic Diagram | |
| FO–17 | Power Supply, Block Diagram | |
| FO–18 | Troubleshooting, Logic Diagram (Sheets l through 15) | |
| FO–19 | Test Set, Schematic Diagram (Sheets l through 6) | |
| FO-20 | Test Set, Wiring Diagram (Sheets l through ) | |
| FO–21 | Power Supply, Schematic Diagram | |
| FO–22 | Waveform Diagram (Sheets l through 5) | |

## LIST OF TABLES


| *Table* | | *Page* |
|---|---|---|
| 2–1 | Decimal Coded Reply TimingOutputs | 2-20 |
| 2-2 | SIF Interrogation Pulse Pair Spacing | 2–33 |
| 3–1 | Test Set Control Settings, | 3– 1 |
| 3–2 | OscilloscopeControl Settings | 3–1 |
| 3–3 | Performance Test Procedure | 3-6 |
| 3–4 | Troubleshooting Procedure | 3-24 |
| 3-5 | DC FAULT Indicator Circuit Check Procedure | 3–50 |
| 3–6 | Overall Inspection Procedure | 3-65 |
| 3–7 | Power Supply Performance Test | 3–65 |
| 3–8 | Radar Trigger Functional Test.. | 3–66 |
| 3-9 | Scope Trigger Functional Test | 3–66 |
| 3–10 | SIF PretriggerFumctionalTest. | 3–68 |
| 3–11 | External Gating Functional Test | 3–69 |
| 3–12 | External Modulation Functional Test | 3-71 |
| 3–13 | Timing Markers Functional Test | 3–72 |
| 3–14 | 30 KHz Functional Test | 3–74 |
| 3–15 | Interleave Functional Test..... | 3–74 |
| 3–16 | BIT Frequency Self Test Functional Test | 3–77 |
| 3–17 | Delayed Rf SweepTriggerFunctional Test | 3-78 |
| 3–18 | Sweep Frequency Mode PRF Countdown Functional Test | 3-80 |
| 3–19 | Decode Functional Test | 3–80 |
| 3–20 | SIF Challenge Video Functional Test | 3-82 |
| 3–21 | Pulse Repetition Functional Test. | 3-83 |
| 3–22 | Pulse Repetition Measurement Functional Test | 3-86 |
| 3–23 | External Trigger Input Functional Test | 3-89 |
| 3–24 | Range Delay Functional Test..... | 3-91 |
| 3–25 | SIF Reply and Substitute Pulse Functional Test | 3-93 |
| 3–26 | Mode 4 Reply Functional Test... | 3–99 |
| 3–27 | Variable Gating Functional Test. | 3–l00 |
| 3–28 | Mode 4 Challenge Video and GTC Trigger Functional Test | 3-103 |
| 3–29 | Rf Output Frequency FunctionalTest | 3–105 |
| 3–30 | Rf OutputPower Functional Test | 3-108 |
| 3–31 | Modulator and DemodulatorFunctional Test | 3-110 |
| 3–32 | Rf Input Power Functional Test. | 3-112 |
| 3–33 | Rf Input Frequency Measurement Functional Test | 3-116 |

# CHAPTER 1

# INTRODUCTION

## 1-1. Scope

*a.* This manual provides general support maintenance instructions for Radar Test Set AN/TPM–25A (test set). It includes a description of the functioning of the equipment, general support maintenance instructions, and diagrams. The maintenance instructions cover troubleshooting, removal and replacement instructions, adjustment and alignment procedures, repair instructions, and testing procedures.

*b.* Operator and organizational maintenance instructions are contained in TM 11 –6625–2610–12.

## 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 (MWOs) pertaining to the equipment,

## 1-3. 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 4610.33 B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

## 1-4. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using Standard Form 368, Quality Deficiency Report. Instructions for preparing EIR's are provided in TM 38–750, The Army Maintenance Management System. EIRs should be mailed directly to Commander, US Army Communications and Electronic Materiel Readiness Command, ATTN: DRSEL–ME–MQ, Fort Monmouth, NJ 07703. A reply will be furnished to you.