

TECHNICAL MANUAL
OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

FOR
SPECTRUM ANALYZER IP-1 21 6(P)/GR
(HEWLETT-PACKARD MODEL 141T)
(NSN 6625-00 424 4370)

**This copy is a reprint which includes current
pages from Change 1.**

HEADQUARTERS, DEPARTMENT OF THE ARMY

01 JUNE 1977

This manual contains copyright material reproduced by permission of the Hewlett-Packard Company.

TECHNICAL MANUAL,
}
NO 11-6625-2781-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, 1 JUNE 1977

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS)
FOR
SPECTRUM ANALYZER IP- 1216(P)/GR
(HEWLETT-PACKARD MODEL 141T)
(NSN 6625-00-424-4370)**

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 Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q, Fort Monmouth, New Jersey 07703.

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

TABLE OF CONTENTS

Model 141T

Section	Title	Page	Section	Title	Page
0	GENERAL.....	0-1	V	PERFORMANCE CHECK AND AD- JUSTMENTS.....	5-1
I	GENERAL INFORMATION.....	1-1	5-1	Introduction.....	5-1
1-1	Introduction.....	1-1	5-3	Test Equipment.....	5-1
1-4	Description.....	1-1	5-5	Performance Check.....	5-1
1-9	Cathode Ray Tube.....	1-1	5-8	Preliminary Setup.....	5-1
1-11	Warranty.....	1-1	5-9	Beam Finder.....	5-2
1-13	Associated Equipment.....	1-1	5-11	Focus and Astig.....	5-2
1-15	Instrument and Manual Identification.....	1-3	5-13	Trace Align.....	5-5-2
1-19	Inquiries.....	1	-	5-141-3 Calibrator.....	5-2
II	INSTALLATION.....	2-1	5-15	Variable Persistence.....	5-2
2-1	Introduction.....	2-1	5-16	Writing Speed, Fast.....	5-2
2-3	Initial Inspection.....	2-1	5-17	Store Time, Fast.....	5-3
2-6	Preparation for Use.....	2-1	5-18	Writing Speed, Standard.....	5-3
2-9	Three-conductor Ac Power Cable.....	2-2	5-19	Store Time, Standard.....	5-3
2-11	Instrument Mounting.....	2-2	5-21	Adjustments.....	5-3
2-14	Instrument Cooling.....	2-3	5-24	Preliminary Setup.....	5-3
2-17	Claims.....	2-3/2-4	5-25	Low Voltage Power Supply Adjustment.....	5-3
2-19	Repacking for Shipment.....	2-3/2-4	5-26	High Voltage Power Supply Adjustment.....	5-3
III	OPERATION.....	3-1	5-27	Intensity Limit Adjust.....	5-4
3-1	Introduction.....	3-1	5-28	-Geometry--.....	5-5
3-3	Controls and Connectors.....	3-1	5-29	Calibrator Adjustment.....	5-5
3-5	Trace Align.....	3-1	5-30	Pulse Circuit Adjustments.....	5-5
3-7	Beam Finder.....	3-1	VI	REPLACEABLE PARTS DELETED	
3-9	Focus and Astigmatism.....	3-1	VII	MANUAL CHANGES AND OPTIONS.....	7-1
3-11	Z-axis Input.....	3-1	7-1	Introduction.....	7-1
3-13	Plug-in Units.....	3-1	7-3	Manual Changes.....	7-1
3-19	Operating Considerations.....	3-4	7-5	Special Options.....	7-4
3-20	Definitions.....	3-4	7-9	Standard Options.....	7-4
3-22	Control Functions.....	3-4	7-14.	Additional Manual Changes.....	7-4
3-30	Operating Procedures.....	3-5	VIII	SCHMATICS AND TROUBLE- SHOOTING.....	8-1
3-32	Single-shot Operation.....	3-6	8-1	Introduction.....	8-1
IV	PRINCIPI,ES OF OPERATION.....	4-1	8-3	Schematics.....	8-1
4-1	Introduction.....	4-1	8-8	Reference Designations.....	8-1
4-3	Overall Functional Description.....	4-1	8-12	Component Locations.....	8-1
4-5	Low-voltage Power Supply.....	4-1	8-14	Preventive Maintenance.....	8-1
4-7	Calibrator.....	4-1	8-15	DELETED.	
4-9	High-voltage Power Supply.....	4-1	8-17	Filter Maintenance.....	8-2
4-11	Pulse Circuit.....	4-2	8-19	Electrical Maintenance.....	8-2
4-13	Horizontal Driver Circuit.....	4-2	8-21	Repair and Replacement.....	8-2
4-15	Circuit Description.....	4-2	8-23	Instrument Repair.....	8-2
4-16	Low-voltage Power Supply.....	4-2	8-26	CRT Removal and Replacement.....	8-2
4-24	Calibrator.....	4-3	8-29	Fan Removal and Replacement.....	8-2
4-28	High-voltage Supply.....	4-3	8-31	Semiconductor Replacement.....	8-2
4-34	Storage CRT.....	4-4			
4-41	Pulse Circuit.....	4-4			
4-41	STD and Fast Modes.....	4-4			
1-5,3	Pulse Circuit' Store Mode.....	4-6			
4-57	Pulse Circuit: Conventional Mode.....	4-6			
4-60	Trace Align.....	4-7/4-8			
4-62	Plug-in Kit Fabrication.....	4-7/4-8			

TABLE OF CONTENTS

List of Illustrations

Section	Title	Page	Section	Title	Page
8-33.	Servicing Circuit Boards.....	8-3			
8-36.	Overall Troubleshooting	8-3			
8-39.	Front Panel Controls	8-4			
8-41.	Visual Checks	8-4			
8-43.	Waveforms and Voltages	8-4			
8-45.	Final Checks	8-4			
8-47.	Detailed Troubleshooting	8-4			
8-48.	Low-Voltage Supply	8-4			
8-55.	High-Voltage Supply	8-6			
8-60.	Pulse Circuit.....	8-6			
	APPENDIX A References.....	A-1			
	APPENDIX B Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools)				
I	INTRODUCTION.....	B-1			
II	REPAIR PARTS LIST.....	B-9			
			Group OOSpectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T).....	B-9	
			01 Circuit Card Assembly, AI	B-13	
			02 Circuit Card Assembly, Power Supply, A2.....	B-17	
			03 Circuit Card Assembly, Pulse, A.5	B-21	
			04 Circuit Card Assembly, Horizontal Drive, A6	B-25	
			III SPECIAL TOOLS LIST (Not applicable)		
			IV NATIONAL STOCK NUMBER AND PART NUMBER INDEX.....	B-26	
			APPENDIX C Maintenance Allocation		
			I INTRODUCTION	C-1	
			II MAINTENANCE ALLOCATION CHART.....	C-3	
			III TOOL AND TEST EQUIPMENT REQUIREMENTS	C-4	
			IV REMARKS (Not applicable)		

LIST OF ILLUSTRATIONS

Figure	Title	Page	Figure	Title	Page
1-1	Model 141T Display Section	1-0	3-10.	Small Bright Spots caused by Minute Imperfections in Storage Mesh	3-6
1-2	Instrument Serial Number -	1-3	4-1.	Model 141T Block Diagram ---	4-1
2-1	Voltage Selection	2-1	4-2.	Regulated Power Supply- Block Diagram-.....	4-2
2-2	Rear Mounting Procedure.....	2-2	4-3.	High-voltage Power Supply Block Diagram	4-3
3-1.	Mode(141T Controls and Connectors	3-2	4-4.	Pulse Circuit Block Diagram	4-5
3-2	Intensity Adjustment	3-3	4-5.	Erase Functional Waveform	4-6
3-3	Background Illumination immediately after- erasing with 'RITING SPEED in FAST and PERSISTENCE to MAX S.....	3-5	5-1A	Spectrum Analyzer Intensity Limit adjust-.....	5-4
3-4	Persistence with a Slow Repetitive Sweep.....	3-5	5-1.	Adjustment Location	5-7/5-8
3-5	Single-shot Trace Bloom caused by INTENSITY and/or PERSISTENCE set too high	3-5	6-1 thru 6-5	DELETED.....	I
3-6.	Single-shot Display With INTENSITY and PERSISTENCE set the same as figure 3-5 and Increased Amplitude	3-5	7-1A.	Effect of Change 11	7-3
3-7.	Fade Positive after 2 to 4 minutes in STD mode	3-6	7-1.	Component Identification Pulse Circuit A5	7-5
3-8	Single-shot 20 usec/div display	3-6	7-2	Pulse Circuit Schematic.....	7-5
3-9	Same Display as figure :3-S after three minutes in STD mode	3-6	7-3	Line Voltage Schematic	7-6
	Model 11IT		7-4.	Option 009 Schematic Diagram.....	7-6
			7-5.	Pulse Circuit Schematic.....	7-7
			7-6	Line Voltage Schematic	7-8

Model 141T

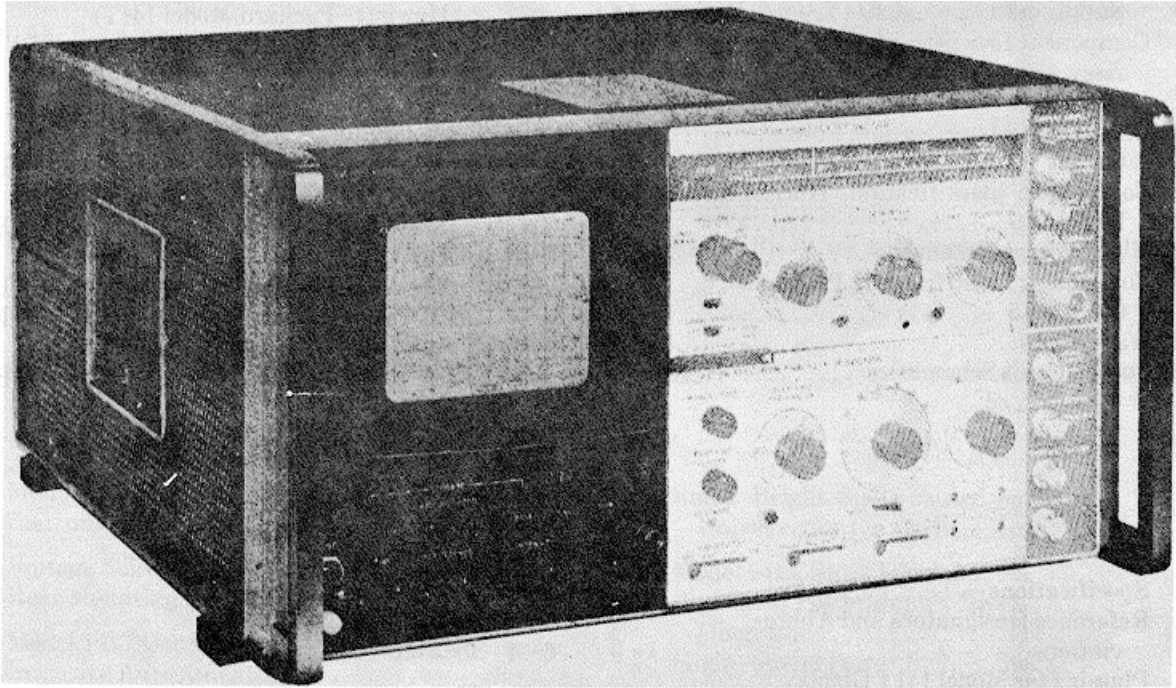
LIST OF ILLUSTRATIONS

Figure	Title	Page	Figure	Title	Page
8-1	Semiconductor Terminal Identification	8-3	B-1	Spectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T) (Sheet 1 of 5)	B-4
8-2	Component Location, Top View	8-8	B-1	Spectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T) (Sheet 2 of 5)	B-4
8-3	Component Location, Bottom View	8-9	B-1	Spectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T) (Sheet 3 or 5)	B-6
8-4	Component Location, Front View	8-10	B-1	Spectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T) (Sheet 3 or 5)	B-6
8-5	Component Location, Rear View -	8-12	B-1	Spectrum Analyzer IP-1216(P)/GR (Hewlett-Packard Model 141T) (Sheet 5 of 5)	B-8
8-6	Plug-in Jack Connections	8-13	B-2	Circuit Card Assembly, Diode	B-12
8-7	Auxiliary A and Auxiliary B Wiring Diagram.....	8-13	B-3	Circuit Card Assembly, Power Supply (Sheet 1 of 2)	B-15
8-8	Component Identification, Power Supply A2.....	8-14	B-3	Circuit Card Assembly, Power Supply (Sheet 2 of 2)	B-16
8-9	Component Identification, Diode Assy A1	8-15	B-4	Circuit Card Assembly, Pulse	B-20
8-10	Low Voltage Schematic	8-15	B-5	Circuit Card Assembly, Horizontal Drive.....	B-24
8-11	Component Identification, Power Supply A2	8-16			
8-12	Component Identification, Horizontal Driver A6	8-17			
8-13	High Voltage Schematic	8-17			
8-14	Component Identification, Pulse Circuit A5.....	8-18			
8-15	Waveforms	8-19			
8-16	Pulse Circuit Schematics	8-19			

LIST OF TABLES

Table	Title	Page	Table	Title	Page
1-1	Specifications.....	1-2	6-1		
1-2	Reference Designators and Abbreviations-	1-3	thru		
1-3	Plug-ins for Model 141T Display Section	1-4	6-4	DELETED	
4-1	Current Capability	4-7/4-8	7-1	Manual Changes	7-1
5-1	Recommended Test Equipment	5-1	-1- 7-2	DELETED	
5-2	Low Voltage Power Supply Adjustment	5-4	7-3	Option 009, Replaceable Parts	7-4
			8-1	Troubleshooting High-voltage Supply, No Voltage	8-5
			8-2	Troubleshooting High-voltage Supply, Incorrect Voltage	8-5
			8-3	Schematic Diagram Notes	8-7

Change 1 v



141T-R-14 1

Figure 1-1. Model 141T Display Section

**SECTION 0
GENERAL**

0-1. SCOPE.

This manual describes Spectrum Analyzer IP-1216(P)/GR (fig. 1-1) and provides instructions for operation and maintenance. Through- out this manual, the IP-a216(P)/GR is referred to as the Hewlett-Packard Model lh1T.

0-2. 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.

0-3. 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 AR700-58/NAVSUPINST 4030.29/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.

0-4. 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 directly to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA,-Q, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

Change 1 0-1