TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL FOR

OSCILLOSCOPE OS-261B(V)1/U

(NSN 6625-01-101-1318) (TEKTRONIX MODEL 475 WITH OPTION 04)

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

TM 11-6625-2735-14-1

TECHNICAL MANUAL

No. 11-6625-2735-14-1

HEADQUARTERS DEPARTMENT OF THE ARMY Washington, DC, 17 June 1982

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND **GENERAL SUPPORT MAINTENANCE MANUAL**

OSCILLOSCOPE OS-261B(V)1/U (TEKTRONIX MODEL 475 WITH OPTION 04) (NSN 6625-01-101-1318) OSCILLOSCOPE OS-261C(V)1/U (TEKTRONIX MODEL 475 WITH OPTION 04 AND OPTION 07) (NSN 6625-01-119-7314)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007. In either case, a reply will be furnished direct to you.

This manual is an authentication of the manufacturer's commercial literature which, through usage, has been found to cover the data required to operate and maintain this equipment. Since the manual was not prepared in accordance with military specifications, the format has not been structured to consider levels of maintenance.

TABLE OF CONTENTS

		Page	4 MAINTENANCE (cont)	Page
SECTION 0	INTRODUCTION	0-1	CABINET AND RACK ADAPTER REMOVAL	
SECTION 1	GENERAL INFORMATION AND		Standard Cabinet Removal	4-2
OLOTION 1	INSTALLATION		Standard Cabinet Installation	4-3
			Rack Adapter Removal	4-3
	Introduction	1-1	Rack Adapter Installation	4-4
	Characteristics	1-1	PREVENTIVE MAINTENANCE	
	Installation	1-13	Introduction	4-4
			Cleaning	4-4
			Visual Inspection	4-6
2	OPERATING INFORMATION		Lubrication	4-6
_			Semiconductor Checks	4-6
	PRELIMINARY INSTRUCTIONS		Recalibration	4 4
	Introduction	2-1	TROUBLESHOOTING	
	Safety Information	2-1	Introduction	4-6
	Operating Power Sources	2-1	Troubleshooting Aids	4-6
	Line Voltage and Regulating Range	2-1	Troubleshooting Equipment	4-7
	Options	2-2	Troubleshooting Techniques	4-10
	CONTROLS AND CONNECTORS	0.0	Special Troubleshooting Information	4-14
	General (ODT)	2-2	CORRECTIVE MAINTENANCE	
	Cathode-Ray Tube (CRT) and Display	2-2	Introduction	4-18
	Vertical Deflection System (Channel 18 Channel 2)	2-2	Obtaining Replacement Parts	4-19
	A and B Triggering	2-5	Soldering Techniques	4-19
	A and B Triggering A and B Sweep	2-6	Small Component Replacement	4-20
	Calibrator and Power	2-7	Circuit Board Replacement	4-22
	Rear Panel	2-8	Power Transformer Removal	4-29
	OBTAINING BASIC DISPLAYS	2-0	Cathode-Ray Tube Removal	4-30
	Introduction	2-6	Cathode-Ray Tube Installation	4-31
	Normal Sweep Display	2-6	High-Voltage Multiplier Removal	4-31
	Magnified Sweep Display	2-9	Delay Line Removal Recalibration After Repair	4-32 4-32
	Delayed Sweep Displays	2-9	Instrument Repackaging	4-32
	Mixed Sweep Displays	2-9	пізнипіені Кераскаўніў	4-32
	X-Y Display	2-9		
			5 PERFORMANCE CHECK	
			Introduction	5-1
			Using This Procedure	5-1
3	CIRCUIT DESCRIPTION		TEST EQUIPMENT REQUIRED	
•	CIRCOTT BEGORII FIGH		General	5-1
	Introduction	3-1	Special Calibration Fixtures	5-1
	Digital Logic	3-1	Performance Check Equipment Alternatives	- 4
	OUTLINE FOR CIRCUIT DESCRIPTION	3-1	OUTLINE FOR PERFORMANCE CHECK	5-1
	BLOCK DIAGRAM	3-2	PRELIMINARY PROCEDURE FOR	5-3
	CHANNEL 1 PREAMP	3-4	PERFORMANCE CHECK	5-4
	CHANNEL 2 PREAMP	3-6	Operating Voltage	5-4
	VERTICAL CHANNEL SWITCHING	3-7	Power Source	5-4
	VERTICAL OUTPUT AMPLIFIER	3-9	Warm Up	5-4
	A TRIGGER GENERATOR	3-10	Operating Temperature	5-4
	B TRIGGER GENERATOR	3-12	DISPLAY AND VERTICAL SYSTEM	0 1
	SWEEP AND Z-AXIS LOGIC	3-12	CHECK	5-5
	SWEEP GENERATORS (AND) TIMING AND HORIZONTAL DISPLAY		TRIGGER SYSTEM CHECK	5-9
	SWITCHING	3-16	HORIZONTAL SYSTEM CHECK	5-15
	HORIZONTAL AMPLIFIER	3-20	GATE OUTPUTS, EXTERNAL Z-AXIS	
	LOW-VOLTAGE POWER SUPPLY	3-21	AND CALIBRATOR CHECKS	5-19
	CRT CIRCUIT	3-24		
	CALIBRATOR	3-27		
	FAN MOTOR CIRCUIT	3-27		
			6 SCHEMATIC DIAGRAMS &	6-1
4	MAINTENANCE		OPTIONS 04 AND 07	
	Maintenance Section Outline	4-1	7 REPLACEABLE MECHANICAL PARTS	7-1

TABLE OF CONTENTS (CONT.)

	TABLE OF	CO		413 (CON1.)	
		Page			Page
APPENDIX .	A REFERENCES			Column Entries	D-2
Section I.	B COMPONENTS OF END ITEM LIST INTRODUCTION	B-1		Tool and Test Equipment Requirement Remarks	D-2 D-2
	SCOPE GENERAL	B-1 B-1	Section II.	MAINTENANCE ALLOCATION CHART	
	EXPLANATION OF COLUMNS	B-1	III.	TOOL AND TEST EQUIPMENT REQUIREMENTS FOR OSCILLOSCOPE	D-5
II.	INTEGRAL COMPONENTS OF END ITEM	B-5		OS-261B(V)1/U	
III.	BASIC ISSUE ITEMS	B-8	IV.	REMARKS	D-7
APPENDIX C ADDITIONAL AUTHORIZATION LIST (Not Applicable)			APPENDIX E Section I.	EXPENDABLE SUPPLIES AND MATERIALS LIST INTRODUCTION	
_	MAINTENANCE ALLOCATION			Scope Evaluation of Columns	E-1 F-1
Section I.	INTRODUCTION General Maintenance Function	D-1 D-1	II.	EXPENDABLE SUPPLIES AND MATERIALS	E-1 E-2
Fig. No.	LIST OF I	LLU Page No.	JSTR	-	Page No.

Fig. No.		Page No.	Fig. No.		Page No.
1-1	Oscilloscope OS-261B(V)1/U and OS-261C(V)1/U	0-0	4-5	Locations of circuit boards in the 475	
1-2	Delay Time and Differential Time Measurement Accuracy (Detailed)	1-7	4-0	Oscilloscope.	4-23
2-1	Regulating Range Selector and Line Fuse.	2-2	4-6	Locations of power transformer secondary wires.	4-29
2-2	Front panel and rear panel controls and connectors.	2-3	6-1	Option 04 Schematic Diagram	6-2
3-1	Basic block diagram of the 475.	3-3	6-2	Option 07 Simplified Block Diagram	6-2.2
3-2	Detailed block diagram of the Channel 1 Vertical Preamplifier circuit.	3-5	6-3	Option 07 DC Inverter	6-2.3
3-3	Detailed block diagram of the Channel 2 Vertical Preamplifier circuit.	3-7	6-4	Option 07 Primary Winding	6-2.4
			6-5	Typical Battery Pack Discharge Curves	6-2.5
3-4	Detailed block diagram of the Vertical Channel Switching circuit	3-8	6-6	Circuit Board Layout with Test Voltages	6-2.6
3-5	Detailed block diagram of the A Trigger Generator		6-7	Typical Idealized Waveforms	6.2.6
	circuit.	3-10	6-8	Inverter Balance	6.2.7
3-6	Detailed block diagram of the Sweep and Z-Axis Logic circuits.	3-13	6-9	Option 07 Exploded View	6.2.8
3-7	Detailed block diagram of the Sweep Generator		7-1	A1 and A2 Boards Component Locations	7-2
	circuits.	3-17	7-2	A3 Board Component Locations	7-3
3-8	Detailed block diagram of the Horizontal Amplifier circuit	3-20	7-3	A4 Board Component Locations	7-5
3-9	Detailed block diagram of the Power Supply circuit	3-22	7-4	A5 Board Component Locations	7-6
3-10	Detailed block diagram of the CRT circuit.	3-25	7-5	A6 Board Component Locations	7-7
3-11	Detailed block diagram of the Calibrator circuit.	3-27	7-6	A7 Board Component Locations	7-8
4-1	Removing the standard cabinet.	4-2	7-7	A8 Board Component Locations	7-9
4-2	Color codes for resistors and capacitors.	4-8	7-8	A9 Board Component Locations	7-12
4-3	Lead configurations of semiconductors used in this instrument.	4-9	7-9	Cabinet Exploded View	7-40
4-4	Troubleshooting chart for the 475 Oscilloscope.	4-12	B-1	Oscilloscope OS-261B(V)1/U and OS-261C(V)1/U	B-1

LIST OF ILLUSTRATIONS (CONT.)

Fig. No.		Page No.	Fig. No.		Page No.	
FO-1	Block Diagram	Located back of Manual	FO-10	Timing and Horizontal Display Switching Schematic Diagram	Located back of	
FO-2	Channel 1 Vertical Preamplifier Schematic				•	Manual
	Diagram		FO-11	Horizontal Amplifier Schematic Diagram		
FO-3	Channel 2 Vertical Preamplifier Schematic Diagram		FO-12	Low Voltage Power Supply Schematic Diagram		
FO-4	Vertical Channel Switching Schematic Diagram	FO-13	CRT Circuit and Z-Axis Amplifier Schematic			
			FO-14	Calibrator and Fan Circuit Schematic Diagram		
FO-5	Vertical Output Amplifier Schematic Diagram					
FO-6	A Trigger Generator Schematic Diagram		FO-15	Front Panel and Chassis Exploded View		
FO-7	B Trigger Generator Schematic Diagram		FO-16	Right Side Exploded View		
FO-8	Sweep and Z-Axis Logic Schematic Diagram		FO-17	Left Side and Bottom Exploded View		
FO-9	Sweep Generators Schematic Diagram					

LIST OF TABLES

able No.		Page No.	Table No.	Page No.
1-1	ELECTRICAL	1-2	4-3 Power Supply Resistance Check	4-15
1-2	ENVIRONMENTAL	1-11	4-4 Fuse Rating, Location and Functions	4-22
1-3	PHYSICAL	1-12	4-5 Calibration Interaction After Repair or Adjustmen	it 4-33
2-1	Regulating Ranges	2-1	5-1 Test Equipment Required for Performance Che	ck 5-2
3-1	Input/Output Logic for U370	3-8	5-2 Vertical Deflection Accuracy	5-7
3-2	Horizontal Display Sweep Generator Terminolog	gy 3-16	•	
4-1	Circuit Number-to-Diagram Locator	4-7	5-3 Differential Delay Time Accuracy	5-17
4-2	Power Supply Tolerance and Ripple	4-15	5-4 Delay Time Settings	5-18

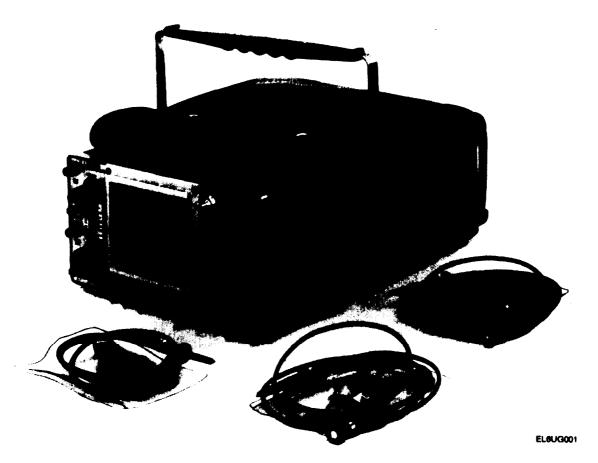


Fig. 1-1. Oscilloscope OS-261B(V)1/U and OS-261C(V)1/U.

NOTE

UNITS WITH OPTION 07, POWER SUPPLY PP-7549/U (TEKTRONIX MODEL 1106), WILL USE TM 11-6625-2973-14 FOR POWER SUPPLY MAINTENANCE.



Fig. 1-1.1. Oscilloscope, OS-261B and OS-261C(V)1/U, Power Supply -1106 Battery Pack.

SECTION 0 INTRODUCTION

Scope

This manual describes Oscilloscope OS-261B(V)1/U and OS-261C(V)1/U and provides instructions for operation and maintenance. Throughout this manual, the OS-261B(V)1/U is referred to as Tektronix Model 475 with option 04, and the OS-261C(V)1/U is referred to as Tektronix Model 475 with option 07.

Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new additions, changes, or additional publications pertaining to the equipment.

Maintenance Forms, Records, Ind Reports

- a. Reports of MaIntenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management Update.
- b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

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 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

Reporting Equipment Improvement Recommendations (EIR)

If your OS-261B(V)1/U and OS-261C(V)1/U needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007. We'll send you a reply.

Administrative Storage

To prepare the equipment for administrative storage, ascertain its operability and reliability. In addition, use the proper packing materials.

Destruction of Army Electronics Materiel

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