

TECHNICAL MANUAL

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

OSCILLOSCOPE AN/USM-273

(NSN 6625-00-930-6637)

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

HEADQUARTERS, DEPARTMENT OF THE ARMY

JANUARY 1972

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 MANIJAL WAS NOT PREPARED IN ACCORDANCE WITH MILITARY SPECIFICATION, THE FORMAT HAS NOT BEEN STRUCTURED TO CONSIDER LEVEL OF MAINTENANCE NOR TO INCLUDE A FORMAL SECTION ON DEPOT MAINTENANCE STANDARDS.

WARNING

DANGEROUS VOLTAGES
EXIST IN THIS EQUIPMENT

DON'T TAKE CHANCES!

CAUTION

Special 3% silver solder is required on the ceramic terminal strips in this equipment. A 40- to 75-watt soldering iron should be used and it should be tinned with the same special solder. Additional quantities of the solder may be procured under FSN 3439-912-8698. Ordinary solder may be used only in dire emergency.

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Operator's Organizational, Direct Support, General Support, and Depot
Maintenance Manual Including Repair Parts and Special Tools Lists

OSCILLOSCOPE AN/USM-273

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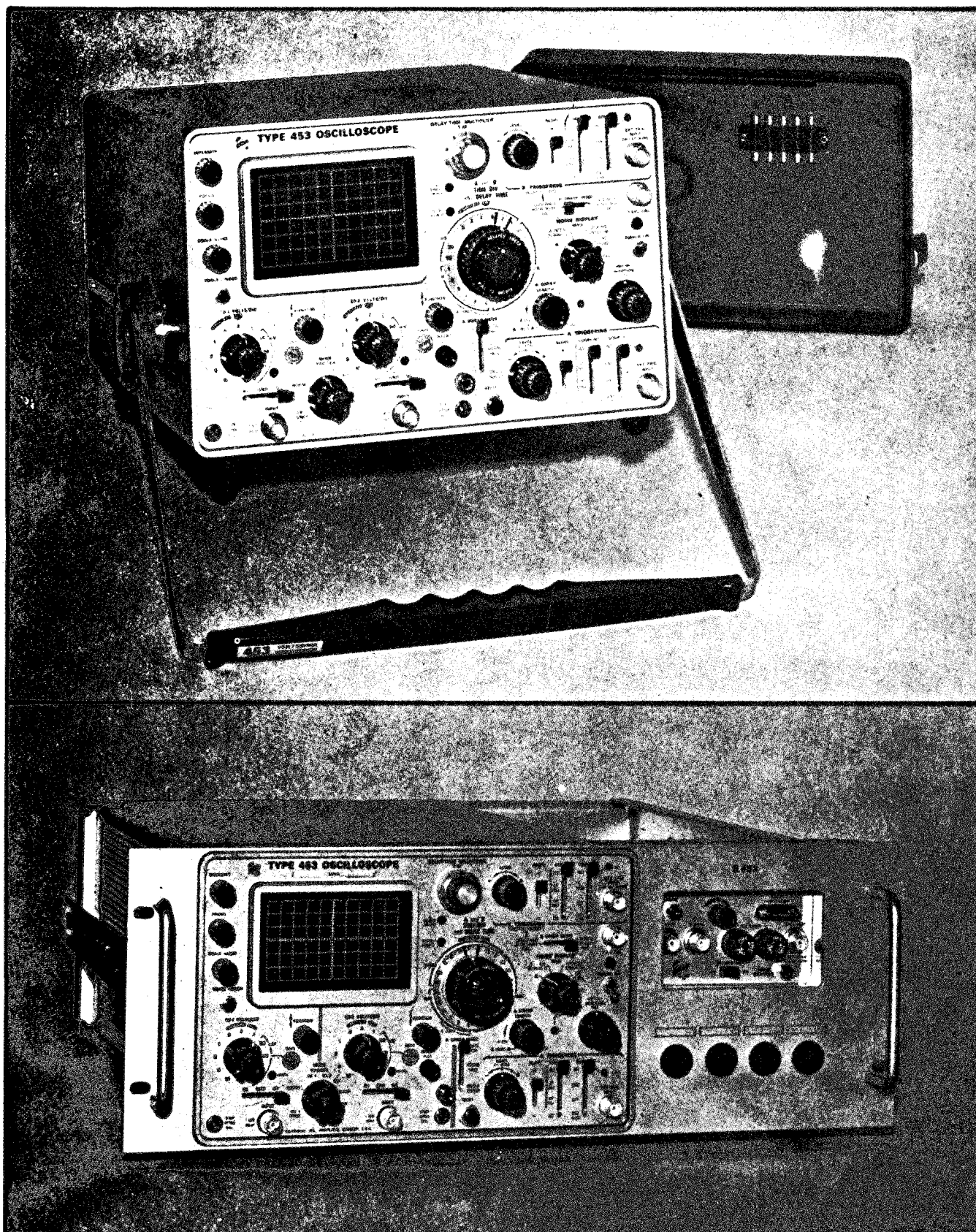


Fig. 1-1. Top; the Type 453 Oscilloscope. Bottom; the Type R453 Oscilloscope.

SECTION 0

INSTRUCTIONS

0-1. Scope

This manual describes Oscilloscope AN/USM-273 (fig. 1-1) and provides maintenance instructions. Throughout this manual, the AN/USM-273 is referred to as the Tektronix Type 453 Oscilloscope. The maintenance allocation chart appears in appendix C. Repair parts and special tools lists are contained in TM-6625-1722-24P.

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. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

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

0-4. Reporting Equipment Improvement Recommendations (EIR)

If your Oscilloscope AN/USM-273 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. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

0-5. Administrative Storage

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

0-6 Destruction of Army Electronics Materiel

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

0-7. 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 or DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, US 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.

SECTION 1

CHARACTERISTICS

Introduction

The Tektronix Type 453 Oscilloscope is a transistorized portable oscilloscope designed to operate in a wide range of environmental conditions. The light weight of the Type 453 allows it to be easily transported, while providing the performance necessary for accurate high-frequency measurements. The dual-channel DC-to-50 MHz vertical system provides calibrated deflection factors from 5 millivolts to 10 volts/division. Channels 1 and 2 can be cascaded using an external cable to provide a one millivolt minimum deflection factor (both VOLTS/DIV switches set to 5 mV).

The trigger circuits provide stable triggering over the full range of vertical frequency response. Separate trigger controls are provided to select the desired triggering for the A and B sweeps. One of three sweep modes can be selected for the A sweep; automatic, normal or single sweep. The horizontal sweep provides a maximum sweep rate of 0.1 microsecond/division (10 nanosecond/division using 10X magnifier) along with a delayed sweep feature for accurate relative-time measurements. Accurate X-Y measurements can be made with Channel 2 providing the vertical deflection, and Channel 1 providing the horizontal deflection. (TRIGGER switch set to CH 1 ONLY, HORIZ DISPLAY switch set to EXT HORIZ). The regulated DC power supplies maintain con-

stant output over a wide variation of line voltages and frequencies. Total power consumption of the instrument is approximately 90 watts.

Information given in this instruction manual applies to the Type R453 also unless otherwise noted. The Type R453 is electrically identical to the Type 453 but is mechanically adapted for mounting in a standard 19-inch rack. Rack-mounting instructions, a mechanical parts list and a dimensional drawing for the Type R453 are provided in Section 10 of this manual.

The electrical characteristics which follow are divided into two categories. Characteristics listed in the Performance Requirement column are checked in the Performance Check and Calibration sections of this manual. Items listed in the Operational Information column are provided for reference use and do not directly reflect the measurement capabilities of this instrument. The Performance Check procedure given in Section 5 of this manual provides a convenient method of checking the items listed in the Performance Requirement column. The following electrical characteristics apply over a calibration interval of 1000 hours at an ambient temperature range of -15°C to +55°C, except as otherwise indicated. Warm-up time for given accuracy is 20 minutes.

ELECTRICAL CHARACTERISTICS

VERTICAL DEFLECTION SYSTEM

Characteristic	Performance Requirement	Operational Information
Deflection Factor	5 millivolts/division to 10 volts/division in 11 calibrated steps for each channel. One millivolt/division when Channel 1 and 2 are cascaded.	Steps in 1-2-5 sequence
Deflection Accuracy	Within $\pm 3\%$ of indicated deflection with VARIABLE control set to CAL. Cascaded deflection factor uncalibrated.	With gain correct at 20 mV
Variable Deflection Factor	Uncalibrated deflection factor at least 2.5 times the VOLTS/DIV switch indication. This provides a maximum uncalibrated deflection factor of 25 volts/division in the 10 volts position.	
Bandwidth at Upper -3 dB point (with or without P6010 Probe)		
20 mV to 10 VOLTS/DIV	DC to 50 MHz or greater	Driven from 25-ohm source
10 mV/DIV	DC to 45 MHz or greater	
5 mV/DIV	DC to 40 MHz or greater	
Channels 1 and 2 cascaded	DC to 25 MHz or greater	Measured at one millivolt/division
Risetime (calculated). With or without P6010 Probe.		Risetime calculated from bandwidth measurement using the formula:
20 mV to 10 VOLTS/DIV	Less than 7 nanoseconds	$t_r = \frac{350}{BW}$ Where: t_r = Risetime in nanoseconds. BW = Bandwidth in megahertz.
10 mV/DIV	Less than 7.8 nanoseconds	
5 mV/DIV	Less than 8.75 nanoseconds	
Channels 1 and 2 cascaded	Less than 14 nanoseconds	