**WARNING**

THE FOLLOWING SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO AVOID PERSONAL INJURY, DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.



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TEK SERVICE MANUAL

070-4717-01
PRODUCT GROUP 5E
(part of pkg. 062-7124-02)

# The 1240/1241 Logic Analyzer

## SERVICE MANUAL, VOL. II

PLEASE CHECK FOR CHANGE INFORMATION
AT THE REAR OF THIS MANUAL.

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# MANUAL REVISION STATUS

**PRODUCT:** 1240/1241 LOGIC ANALYZER SERVICE MANUAL VOL. II.

This manual supports the following versions of this product: All

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# PREFACE

The 062-7124-02 manuals package consists of the *1240/1241 Service Manual* (volumes 1 and 2) and various addenda. The *1241 Service Manual Addendum*, included in the two-volume set, provides additional support for the 1241 Logic Analyzer. Each manual and addendum in the set has its own part number starting with the prefix 070. Manual part numbers are located on the manual title page.

The *1240/1241 Service Manual* provides information that allows service technicians to check, troubleshoot, repair, and maintain the 1240 and 1241 Logic Analyzers. When servicing a 1241 Logic Analyzer, use both volumes of the service manual and the *1241 Service Manual Addendum* to find complete troubleshooting information. For detailed operating instructions, refer to the *1240/1241 Operator's Manual*.

This manual is designed for use by a qualified service technician having moderate experience with digital circuitry. Familiarity with both TTL and ECL logic families is assumed. Familiarity with and the ability to operate standard test instruments used on digital circuitry, such as an oscilloscope or logic analyzer, is also assumed.

Troubleshooting of the 1240 and 1241 Logic Analyzers is based on the internal diagnostics. The diagnostics produce an on-screen error index message that allows the service technician to quickly identify instrument failure. This manual translates these error indexes into a list of probable causes for instrument failure and lists recommended repair actions.

This manual is divided into 12 sections, found in two volumes. Each section is preceded by a tabbed page for quick reference. Other reference aids included:

- **Manual Table of Contents** – refer to the Table of Contents at the beginning of the manual for a breakdown of sections.
- **Section Table of Contents** – refer to the Table of Contents at the beginning of each section for a detailed breakdown of section contents.
- **Diagnostic Page-Bleed Tabs** – refer to the *Troubleshooting and Repair* section for page-edge bleed tabs that indicate, by their vertical page position, which module's diagnostic information is currently being accessed.

## WHAT THIS MANUAL CONTAINS

### VOLUME 1

**Section 1 – GENERAL INFORMATION.** Provides a basic description of the logic analyzers and an overview of the instrument controls and indicators. It also describes the operating and diagnostic menu layouts.

**Section 2 – SPECIFICATIONS.** Lists electrical, mechanical, and environmental specifications of the logic analyzer.

**Section 3 – OPERATING INFORMATION.** Describes the logic analyzer's power requirements, and lists the probe, pack, and I/O connections. Refer to the *1240/1241 Operator's Manual* for complete operating instructions.

**Section 4 – THEORY OF OPERATION.** Illustrates basic operation by introducing logical function blocks and by showing their relationship to the instrument modules. Also, this section describes the system architecture and the difference between the 1240D1 and 1240D2 acquisition cards.

**Section 5 – VERIFICATION AND ADJUSTMENT PROCEDURES.** Contains functional check procedures, adjustment procedures, and performance verification procedures.

**Section 6 – DISASSEMBLY AND INSTALLATION PROCEDURES.** Describes disassembly and reassembly procedures for instrument pieces.

**Section 7 – MAINTENANCE.** Contains information necessary to maintain the logic analyzers, including general precautions and preventive and corrective maintenance items.

**Section 8 – TROUBLESHOOTING AND REPAIR.** Contains information on the diagnostic tests. The diagnostic test descriptions, associated error indexes, and probable failure causes and solutions are grouped by module name with page-bleed tabs. Also provided are recommended repair practices for parts of the instrument not tested by diagnostics.

## VOLUME 2

**Section 9 – REPLACEABLE ELECTRICAL PARTS.** Contains a list (including Tektronix part numbers) of all replaceable electrical parts in the logic analyzers.

**Section 10 – SCHEMATIC DIAGRAMS.** Contains schematics as well as board and component locator diagrams and tables. The schematic diamond numbers refer to instrument theory discussions located in the *Theory of Operation* section.

**Section 11 – REPLACEABLE MECHANICAL PARTS.** Contains a list (including Tektronix part numbers) of all replaceable mechanical parts in the logic analyzers and provides illustrations to show the location of each of these parts.

**Section 12 – GLOSSARY.** Provides an alphabetical list of signal names and their corresponding descriptions.

# TABLE OF CONTENTS

## VOLUME 1:



## VOLUME 2:

# OPERATOR'S SAFETY SUMMARY

The general safety information in this summary is for both operator and service personnel. Specific cautions and warnings are found throughout the manual where they apply, but may not appear in this summary.

## TERMS IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

## TERMS AS MARKED ON EQUIPMENT

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

## SYMBOLS AS MARKED ON EQUIPMENT

 DANGER — High voltage.

 Protective ground (earth) terminal.

 ATTENTION — refer to manual.

## GROUNDING THE PRODUCT

This product is intended to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground.

This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

## DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electric shock.

## USE THE PROPER POWER CORD

Use only the power cord and connector specified for your product, and be sure it is in good condition.

Refer to the *Operating Information* section of this manual for information on power cords and connectors.

## USE THE PROPER FUSE

To avoid fire hazard, use only a fuse of the correct type, voltage rating, and current rating as specified in the parts list for this product. Also, ensure that the line selector switch is in the proper position for the power source being used.

## DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate this product in an explosive atmosphere unless it has been specifically certified for such operation.

# SERVICE SAFETY SUMMARY

*FOR QUALIFIED SERVICE PERSONNEL ONLY*
*Refer also to the Operator's Safety Summary.*

## DO NOT SERVICE ALONE

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

## USE CARE WHEN SERVICING WITH POWER ON

Dangerous voltages exist at several points in this product. To avoid personal injury, do not touch exposed connections and components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

## USE CAUTION WHEN SERVICING THE CRT

The CRT should be serviced only by qualified personnel familiar with CRT servicing procedures and precautions.

CRTs retain hazardous voltages for long periods of time after power-down. Before attempting any work inside the monitor, discharge the CRT by shorting the anode to chassis ground. When discharging the CRT, connect the discharge path to ground and then the anode.

Use extreme caution when handling the CRT. Rough handling may cause it to implode. Do not nick or scratch the glass or subject it to undue pressure during removal or installation. When handling the CRT, wear safety goggles and heavy gloves for protection.

## REMOVE THE LOOSE OBJECTS

During disassembly or installation procedures, screws or other small objects may fall to the bottom of the mainframe. To avoid shorting out the power supply, do not power up the instrument until such objects have been removed.