

# Tektronix®

**8500**  
MODULAR MDL SERIES  
**TRIGGER TRACE  
ANALYZER**  
INSTALLATION  
SERVICE

INSTRUCTION MANUAL



## 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.

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

This manual supports the following TEKTRONIX products:

8550 Option	8540 Option	Products
03	03	8550F03 8540F03

# 8500 MODULAR MDL SERIES TRIGGER TRACE ANALYZER INSTALLATION SERVICE

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**Beaverton, Oregon 97077**


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Product Group 61

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## PREFACE

## ABOUT THIS MANUAL

This manual contains information on how to install the Trigger Trace Analyzer in a compatible TEKTRONIX microcomputer development system.

**CAUTION**

The Trigger Trace Analyzer should only be installed by a Tektronix Field Service Specialist. Tektronix, Inc., is not obligated to furnish service to repair damage resulting from attempts by unauthorized personnel to install this product. Please call your nearest Tektronix Field Service Office for installation.

## MANUAL ORGANIZATION

This manual is divided into four sections:

Section 1 contains an overview of the Trigger Trace Analyzer.

Section 2 contains instructions for configuring Trigger Trace Analyzer jumpers and straps.

Section 3 provides instructions for installing the Trigger Trace Analyzer.

Section 4 discusses verification of the installed Trigger Trace Analyzer.

NOTE

In this manual, the terms "development system", "mainframe", and "microcomputer development system" apply equally to the 8550 Microcomputer Development Lab and to the 8540 Integration Unit.

## CHANGE INFORMATION

Change notices are issued by Tektronix, Inc., to document changes to the manual after it has been published. Change information is located at the back of this manual, following the yellow tab marked "CHANGE INFORMATION & TEST EQUIPMENT". When you receive the manual, you should enter any change information into the body of the manual, according to instructions on the change notice.

## REVISION HISTORY

As this manual is revised and reprinted, revision history information is included on the text and diagram pages. Original manual pages are identified with an '@' symbol at the bottom inside corner of the page. When existing pages are revised, the '@' symbol is replaced with a revision code and date (REV A OCT 1981). New pages added to a section, whether they contain old, new, or revised information, will be identified with the '@' symbol and a date (@ OCT 1981).

## DOCUMENTATION OVERVIEW

The support documentation for TEKTRONIX microprocessor development systems consists of three groups of manuals: user's manuals, service manuals, and installation manuals.

Users manuals contain information required to operate the system and its peripheral devices. Users manuals are identified by their grey covers and are provided as standard accessories with the system package.

Installation manuals provide information required to install and verify the operation of system components. Installation manuals have blue covers and are provided as standard accessories with the system package.

Service manuals provide information required to test, troubleshoot and repair a system and its peripheral devices. Service manuals are identified by their blue covers and may be purchased as optional accessories.

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### OPERATORS SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be 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.



## SAFETY PRECAUTIONS

### Grounding the Product

This product is grounded through grounding conductors in the interconnecting cables. To avoid electrical shock, plug the supporting system's power cord into a properly wired receptacle. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

### Use the Proper Power Cord

Use only the power cord and connector specified for your product.

Use only a power cord that is in good condition.

Refer cord and connector changes to qualified service personnel.

### Use the Proper Fuse

To avoid fire hazard, use only the fuse specified in the parts list for your product. Be sure the fuse is identical in type, voltage rating, and current rating.

Refer fuse replacement to qualified service personnel.

### Do Not Operate in Explosive Atmospheres

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

### Do Not Remove Covers or Panels

To avoid personal injury, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.

SERVICING SAFETY SUMMARY  
FOR QUALIFIED SERVICE PERSONNEL ONLY

(Refer also to the preceding Operators 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.

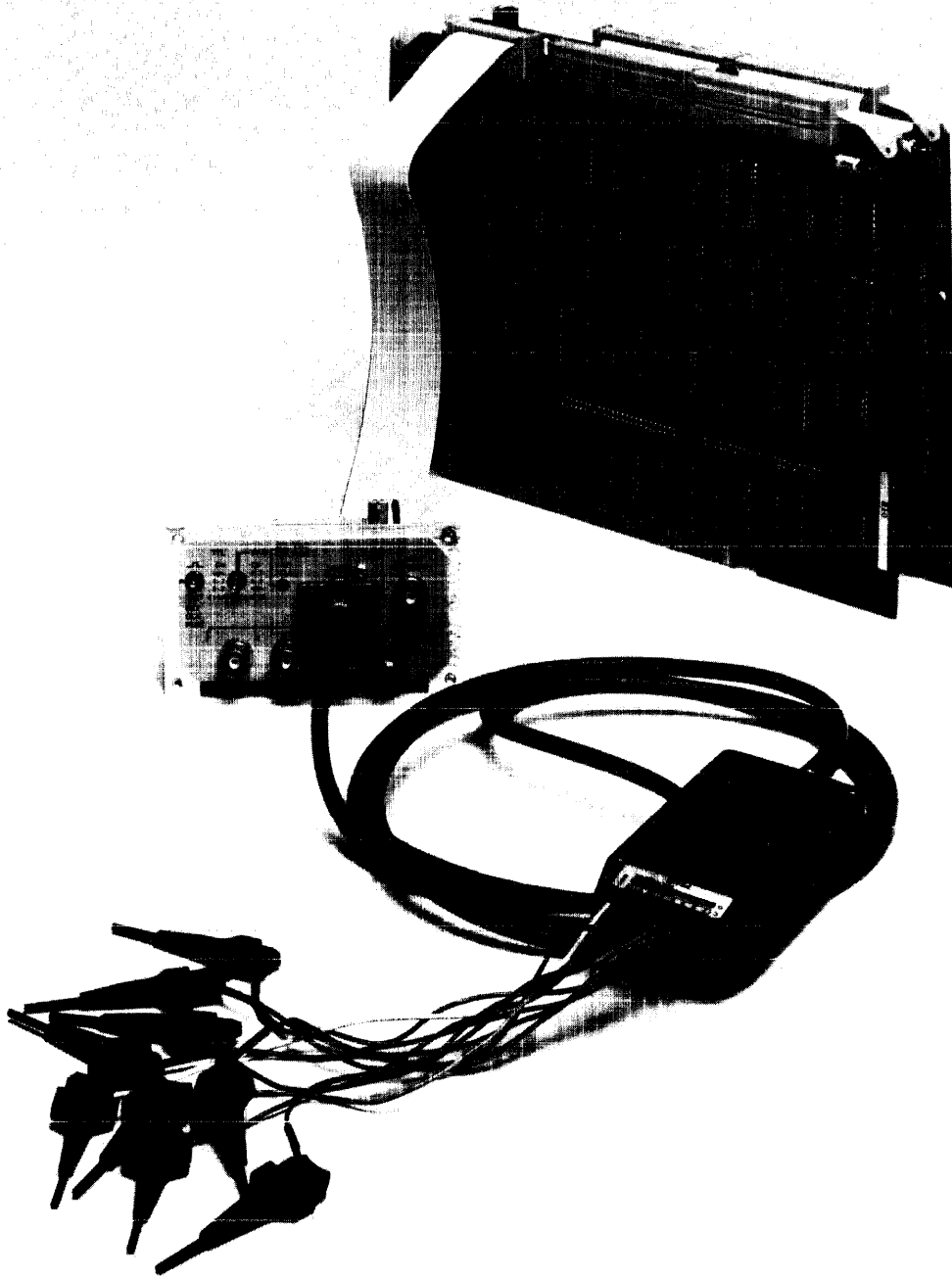
Use Care When Servicing With Power On

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.

Power Source

This product is intended to operate from a power source that will not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.



Trigger Trace Analyzer

3761-8

Section 1GENERAL INFORMATIONINTRODUCTION

The Trigger Trace Analyzer (TTA) is an accessory to TEKTRONIX 8500-series microcomputer development systems. The TTA provides a set of real-time hardware and software debugging tools.

This manual contains procedures for installing the TTA in a compatible 8500-series microcomputer development system and is divided into the following sections:

- Section 1 contains general information about the TTA.
- Section 2 contains information about TTA jumpers and switches.
- Section 3 contains details about installing the TTA in your development system.
- Section 4 contains information about TTA performance verification.

For information about operating the TTA, refer to your System Users Manual and to the Trigger Trace Analyzer Users Manual. Service information is provided in the optional Trigger Trace Analyzer Service Manual.

PRODUCT DESCRIPTION

The Trigger Trace Analyzer has six standard subassemblies. Each subassembly is described briefly in this section. These six standard subassemblies are:

- TTA Circuit Board #1
- TTA Circuit Board #2
- Two TTA Interconnect Cables
- Data Acquisition Interface
- Data Acquisition Probe

**TTA CIRCUIT BOARD #1**

TTA Circuit Board #1 contains memory and control circuitry for the Trigger Trace Analyzer. This circuit board is inserted into the Main Interconnect Board of a compatible microcomputer development system. Figure 1-1 illustrates TTA Circuit Board #1. Refer to Section 3 for specific information on how to install this circuit board.

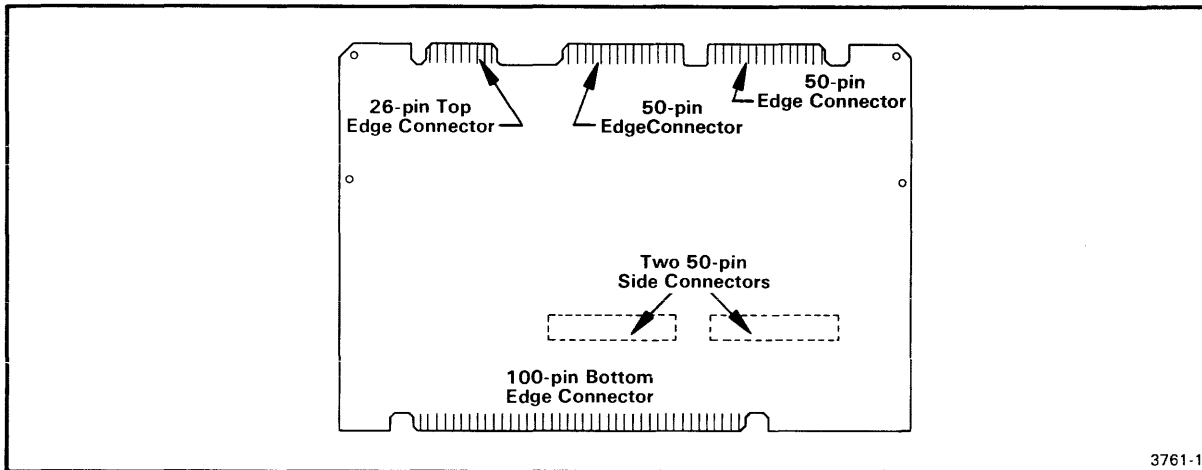


Fig. 1-1. TTA Circuit Board #1.

During normal TTA operation, the 100-pin edge connector at the bottom of this board is inserted into the main interconnect board of a microcomputer development system. The two 50-pin edge connectors at the top of this board are connected to TTA Circuit Board #2 via the TTA Interconnect Cables. The 26-pin edge connector at the top of the board is connected to the Data Acquisition Interface with a 26-line ribbon cable.

**TTA CIRCUIT BOARD #2**

TTA Circuit Board #2 contains memory and control circuitry for the Trigger Trace Analyzer. This circuit board is inserted into the Main Interconnect Board of your microcomputer development system. Figure 1-2 illustrates TTA Circuit Board #2. Refer to Section 3 for specific information on how to install this circuit board.

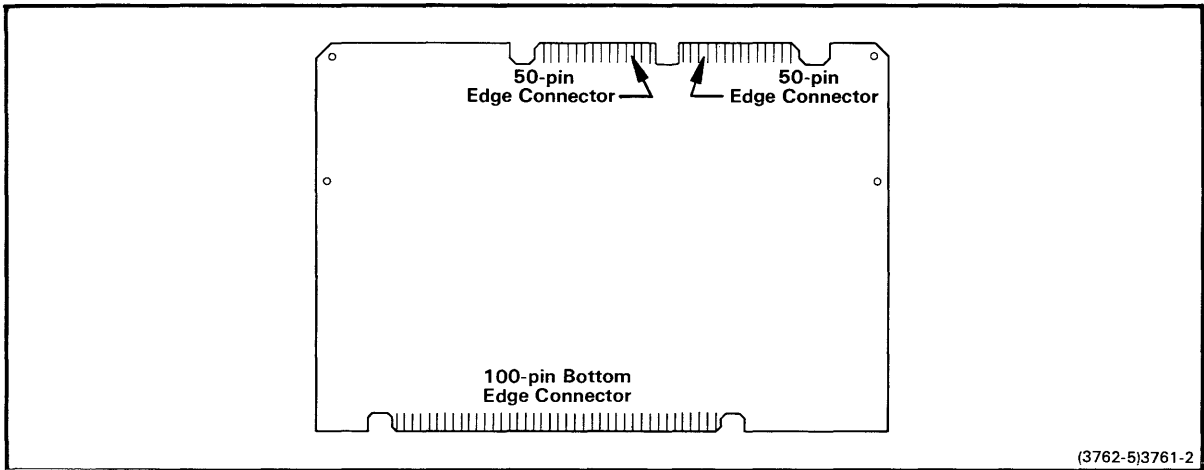


Fig. 1-2. TTA Circuit Board #2.

During normal TTA operation, the 100-pin edge connector at the bottom of this board is inserted into the Main Interconnect Board of a microcomputer development system. The two 50-pin edge connectors at the top of this board are connected to TTA Circuit Board #1 via the TTA Interconnect Cables.

### TTA INTERCONNECT CABLES

The two TTA interconnect cables form an electrical connection between the two TTA circuit boards. Each cable connects a 50-pin edge connector on one TTA board to a 50-pin edge connector on the other TTA board. Figure 1-3 illustrates the TTA Interconnect Cables. Refer to Section 3 for specific information on how to install the TTA Interconnect Cables.

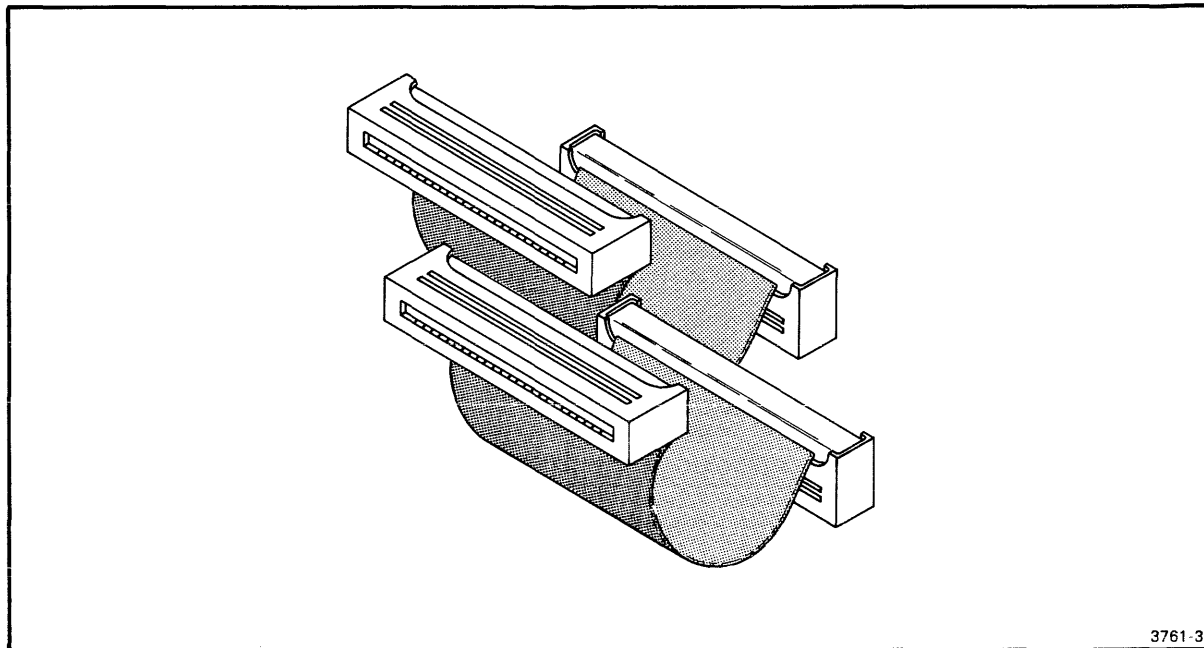


Fig. 1-3. TTA Interconnect Cables.

The 50-pin connectors on these cables accept the 50-pin top-edge connectors of the two TTA circuit boards.

DATA ACQUISITION INTERFACE

The Data Acquisition Interface consists of an interface circuit board, a control panel, and a 26-line ribbon cable. The interface circuit board interfaces signals external to the TTA (and to the microcomputer development system) with the rest of the TTA circuitry. The control panel provides the physical connections and controls for these external signals. The 26-line ribbon cable carries the interfaced signals between the Data Acquisition Interface and TTA Circuit Board #1. Figure 1-4 illustrates the Data Acquisition Interface. Refer to Section 3 for specific information on how to install the Data Acquisition Interface.

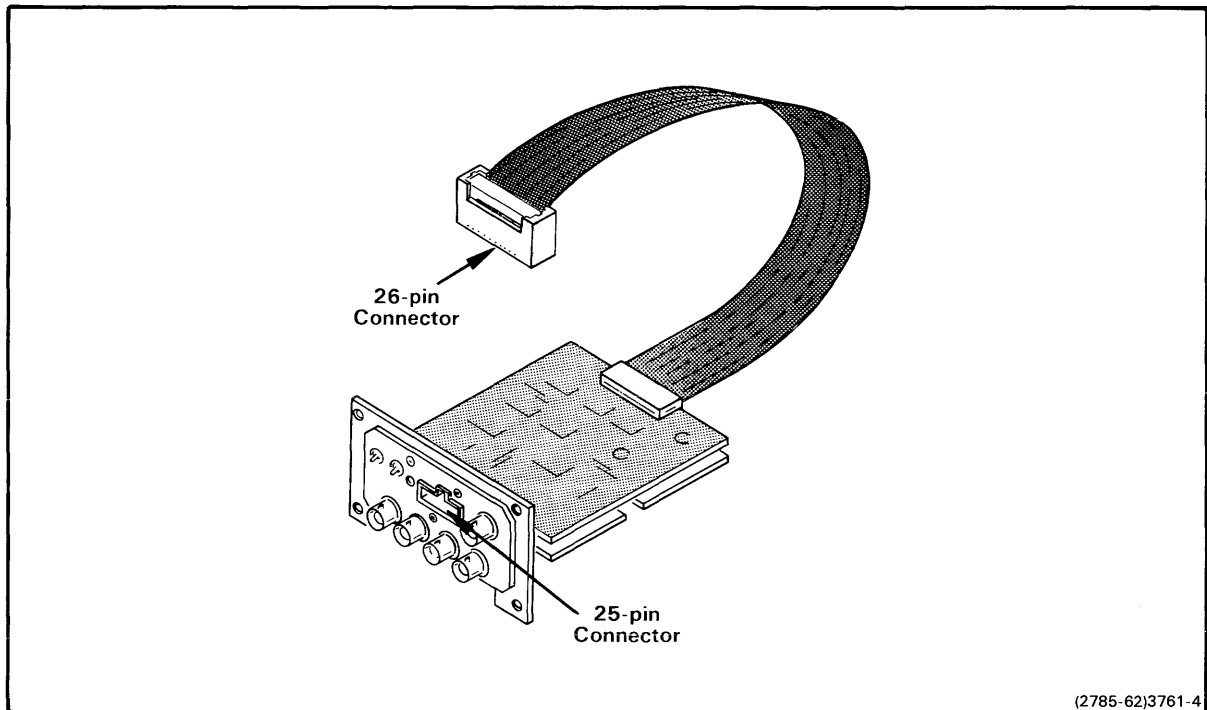


Fig. 1-4. Data Acquisition Interface.

The Data Acquisition Interfaced is installed within the rear panel of your development system. The 26-pin ribbon cable attaches to a top edge connector on TTA Circuit Board #1.



DATA ACQUISITION PROBE

The Data Acquisition Probe used by the TTA is a TEKTRONIX P6451 Data Acquisition Probe. This probe allows the TTA to acquire up to nine external signals, including a clock signal. Figure 1-5 illustrates a P6451 Data Acquisition Probe (probe leads are not shown). Refer to Section 3 for specific information on how to install the Data Acquisition Probe.

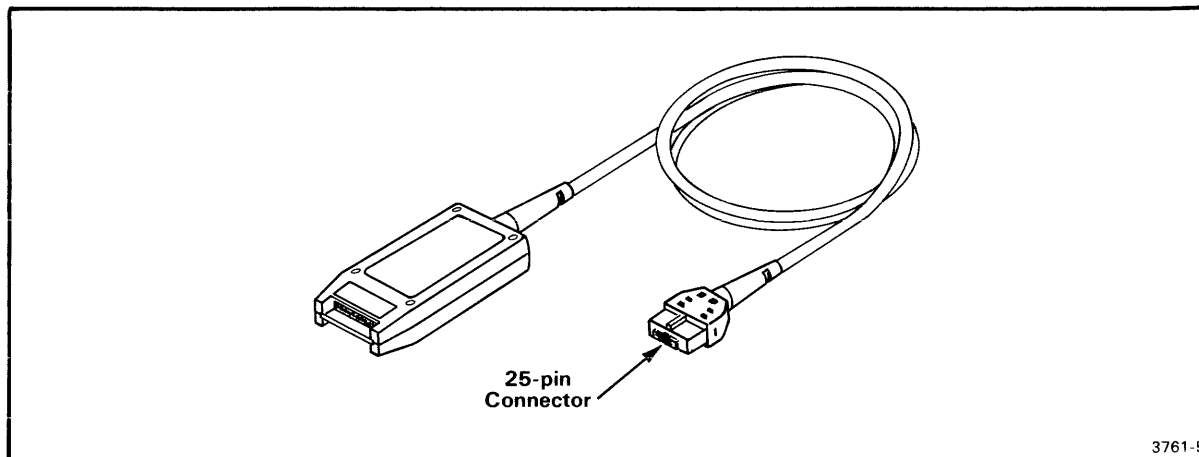


Fig. 1-5. P6451 Data Acquisition Probe.

The 25-pin connector on this probe must be installed in the 25-pin socket on the control panel of the Data Acquisition Interface.

SPECIFICATIONS

Table 1-1  
Environmental Characteristics

Characteristic	Description
Temperature	
Operating	0 C to +50 C (+32 F to +122 F)
Storage	-55 C to +75 C (-67 F to +167 F)
Humidity	To 90% relative non-condensing
Altitude	
Operating	To 4 500 m (15,000 feet)
Storage	To 15 000 m (50,000 feet)

Table 1-2  
Electrical Characteristics

Characteristic	Requirement	Supplemental Information
Voltage	+5.2 Vdc (+/-)5%	
Current	6.966 A @ 5.2 Vdc	With Data Acquisition Interface
	6.900 A @ 5.2 Vdc	No Data Acquisition Interface
Power Dissipation	3.6 Watts (approx)	With Data Acquisition Interface
	3.5 Watts (approx)	No Data Acquisition Interface

Section 2JUMPER CONFIGURATIONS

## TTA CIRCUIT BOARD #1

There are no jumpers, straps, or switches on TTA Circuit Board #1.

## TTA CIRCUIT BOARD #2

TTA Circuit Board #2 has two jumper locations, a switch, an LED, and a row of testpoints. Figure 2-1 illustrates the positions of the jumper locations and testpoint on TTA Circuit Board #2. Refer to Fig. 2-1 as you read the following descriptions.

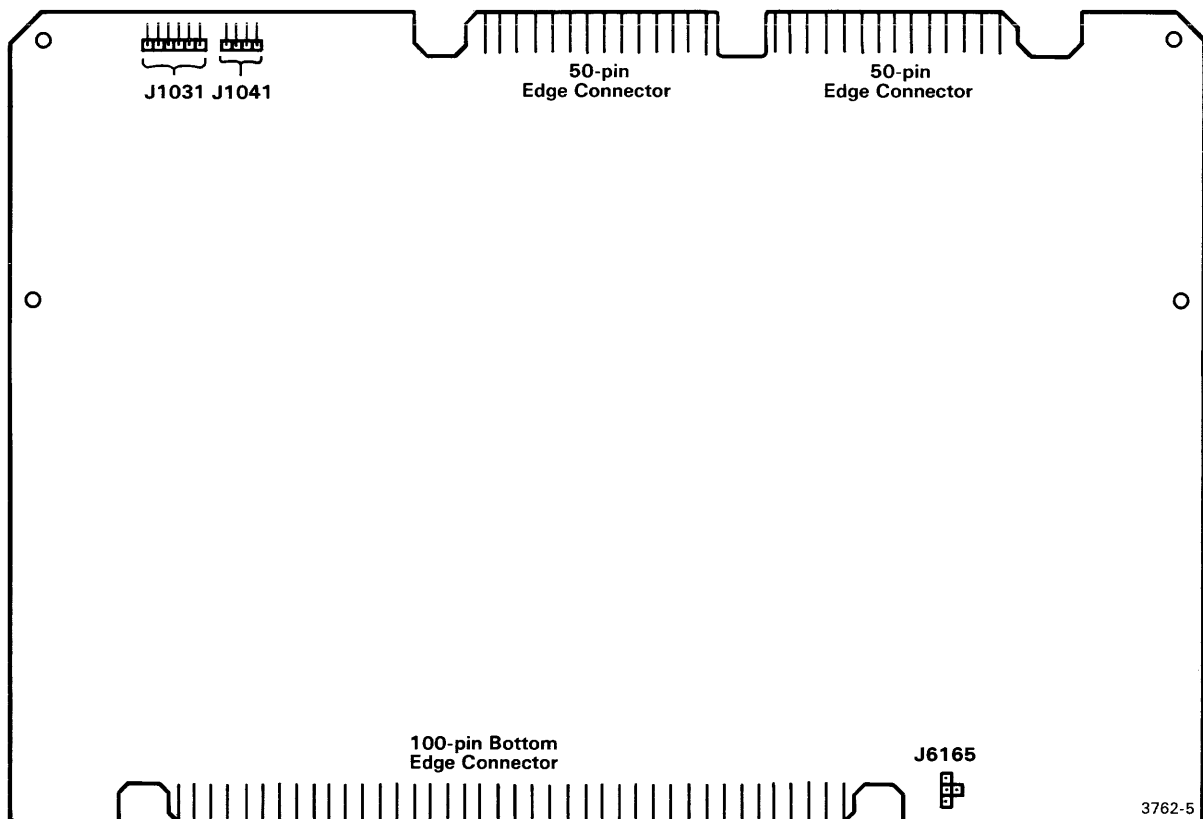


Fig. 2-1. Jumper locations, TTA Circuit Board #2.

Jumper Configurations - TTA Installation

J6165 This jumper position selects a clock signal for the TTA's counter. Figure 2-2 shows how this jumper can be configured. During normal operation, this jumper should select the 5 MHz signal.

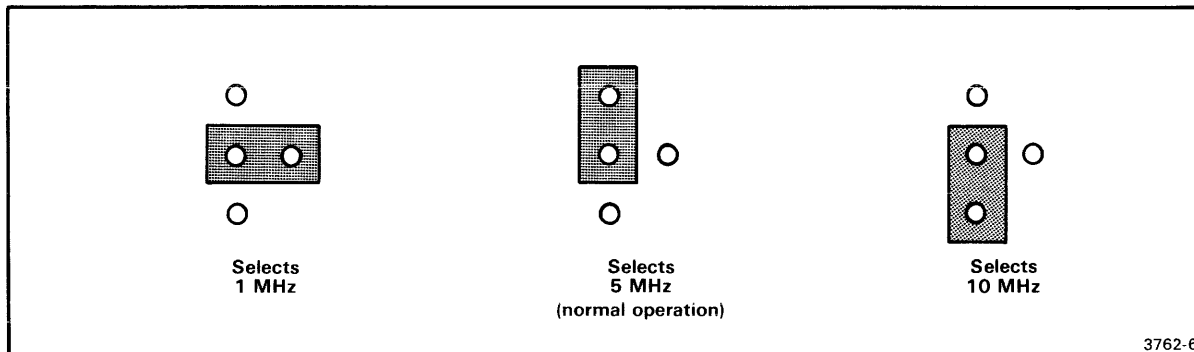


Fig. 2-2. TTA counter clock selection: J6165.

J1031 This jumper position selects either the SLVOPREQ(L) signal or the OPREQ(L) signal for TTA/system timing. Figure 2-3 shows how this jumper can be configured. During normal operation, this jumper should select the SLVOPREQ(L) signal.

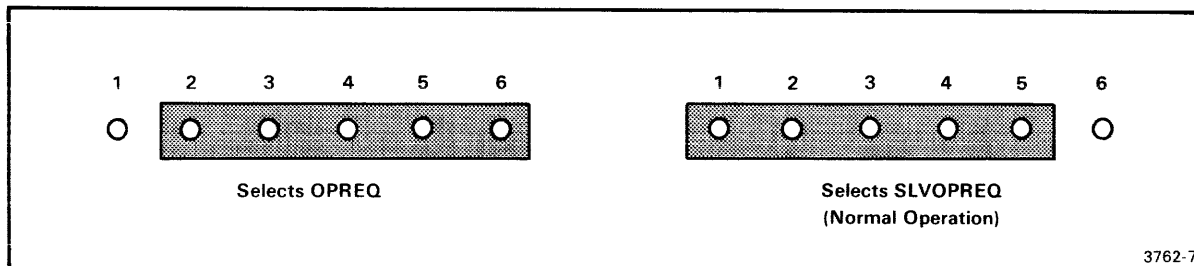


Fig. 2-3. OPREQ/SLVOPREQ selection: J1031.

J1041 This testpoint provides access to four TTA signals: MSTRUN(H), RUN(H), CMEM(L), and logic ground.

SW1051 This momentary-contact switch supports TTA diagnostics for board testing. The switch is not used during normal TTA operation.

NOTE

The LED at the top of TTA board #2 is enabled by the ON(H) signal. This LED, like the test switch, is for servicing only.

Section 3INSTALLATION PROCEDURESINTRODUCTION

This section contains the procedures for installing the Trigger Trace Analyzer in your development system. The following procedures are included:

1. Preparing the development system
2. Installing TTA Circuit Board #1
3. Installing TTA Circuit Board #2
4. Installing the TTA Interconnect Cables
5. Installing the Data Acquisition Interface
6. Reassembling the development system
7. Installing the Data Acquisition Probe
8. Installing Trigger Trace Analyzer Option Firmware

PREPARING THE DEVELOPMENT SYSTEM**WARNING**

Verify that the primary power to the microcomputer development system is OFF.

1. Remove the cover retainers at the upper corners on the rear of the mainframe. See Fig. 3-1.
2. Remove the top cover by sliding it straight back, then set it aside.

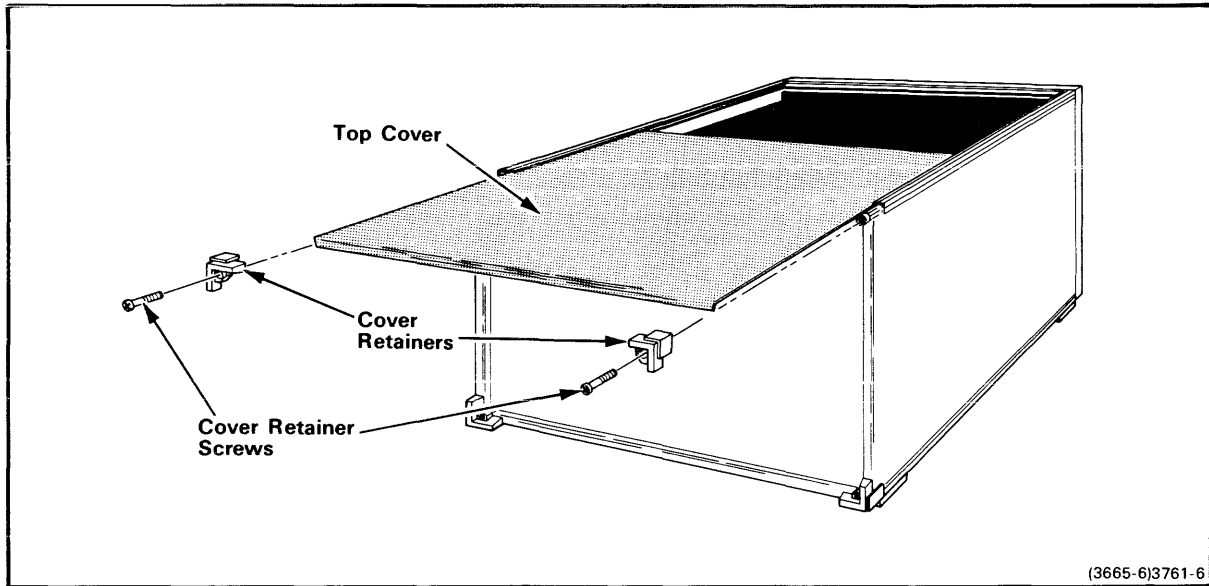


Fig. 3-1. Removing/installing the mainframe top cover.

#### INSTALLING TTA CIRCUIT BOARD #1

1. Facing the front of the mainframe, hold TTA Circuit Board #1 by its upper edges and align it with other circuit boards in the mainframe, with the component side facing left.
2. Guide the circuit board down the vertical channels at position J13 of the microcomputer development system's Main Interconnect Board. See Fig. 3-2.
3. When the circuit board reaches the connector on the Main Interconnect Board, press down firmly and evenly on the top edge of the circuit board until it snaps into place.

INSTALLING TTA CIRCUIT BOARD #2

1. Facing the front of the mainframe, hold TTA Circuit Board #2 by its upper edges and align it with other circuit boards in the mainframe, with the component side facing left.
2. Guide the circuit board down the vertical channels at position J12 of the development system's Main Interconnect Board. See Fig. 3-2.
3. When the circuit board reaches the connector on the Main Interconnect Board, press down firmly and evenly on the top edge of the circuit board until it snaps into place.

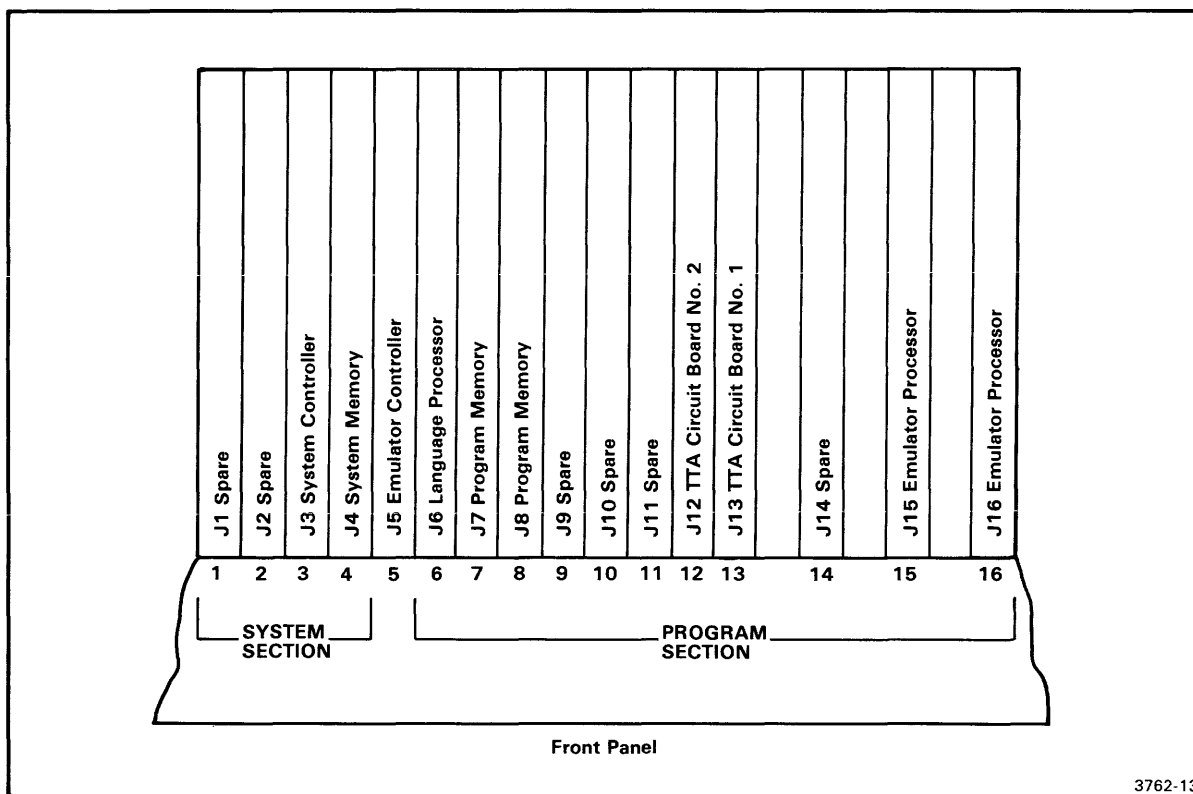


Fig. 3-2. Recommended circuit board arrangement.

### INSTALLING THE TTA INTERCONNECT CABLES

1. Facing the front of the mainframe, grasp one of the TTA Interconnect Cables. Align the socket at one end of the cable with the nearer edge connector at the top of TTA Circuit Board #2 (installed in slot J12). Align the socket at the other end of this same interconnect cable with the nearer edge connector on top of TTA Circuit Board #1 (installed in slot J13). The openings of the sockets must be facing downward, with the ribbon cable running between the two TTA Circuit Boards.
2. Press down evenly and firmly on one of the sockets until it snaps into place.
3. Press down evenly and firmly on the other socket until it snaps into place.
4. Repeat this procedure to install the other TTA Interconnect Cable across the 50-pin edge connectors remaining on each circuit board and towards the rear of the development system's mainframe.

### INSTALLING THE DATA ACQUISITION INTERFACE

1. Now, face the rear panel of the mainframe. Notice a blank plate near the upper left corner of the rear panel. Remove the four screws securing this plate to the mainframe, then remove the plate. Set the screws and the plate aside.
2. Mount the Data Acquisition Interface in the rear panel of the mainframe, as shown in Fig. 3-3. Use the screws removed in step 1.
3. Connect the 26-pin socket at the end of the Data Acquisition Interface's ribbon cable to the 26-pin top edge connector of TTA Circuit Board #1. Be certain that pin 1 of the edge connector is aligned with pin 1 of the socket.



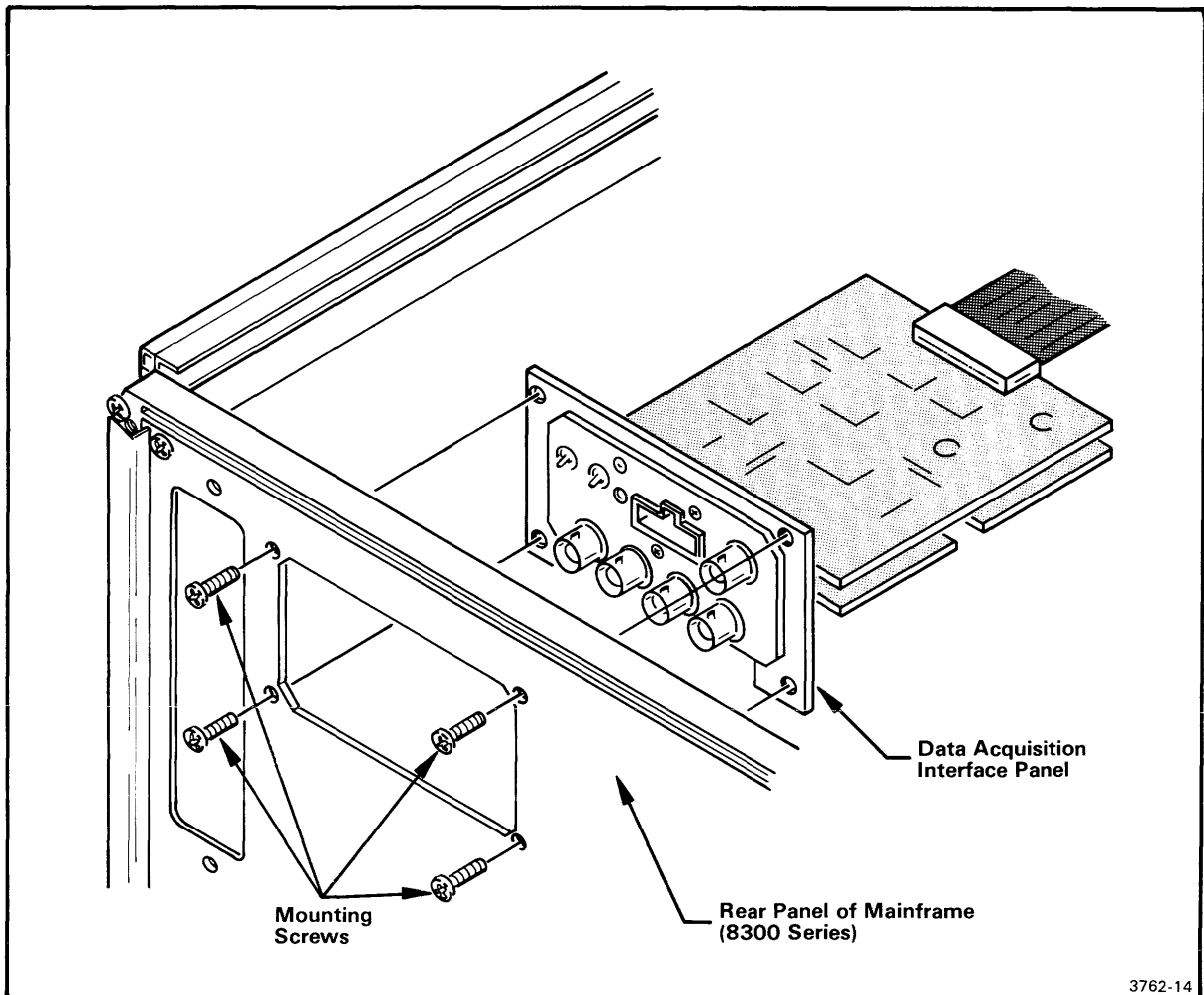


Fig. 3-3. Installing the Data Acquisition Interface.

#### REASSEMBLING THE DEVELOPMENT SYSTEM

1. Refer back to Fig. 3-1. Slide the top cover back into the guide tracks at the top of the mainframe. Be certain that the cover is properly seated in the slot at the front of the mainframe.
2. Place the cover retainers at the upper left and right corners on the rear of the mainframe.
3. Thread the four screws through the cover retainers into the mainframe, and tighten these screws securely.

## Installation Procedures - TTA Installation

### INSTALLING THE DATA ACQUISITION PROBE

Insert the 25-pin connector at the end of the Data Acquisition Probe's cable into the 25-pin socket in the Data Acquisition Interface's control panel.

### INSTALLING TRIGGER TRACE ANALYZER OPTION FIRMWARE

When the Trigger Trace Analyzer (TTA) option is shipped for installation into an 8540 rather than an 8550, the option package includes control/diagnostic firmware for the 8540. The firmware is in the form of three ROM devices, to be installed on the 8540 System ROM board. (The same firmware is available also from Tektronix in an 8550-to-8540 conversion kit (Tektronix part No. 020-0795-0X) that converts your 8550 TTA option for 8540 operation.)

Typically, your 8540 System ROM board contains the basic system firmware, consisting of the 8540 operating system and diagnostic procedures. In addition, the board may also contain some option control/diagnostic firmware.

Although there is no electrical reason to install a particular ROM into a particular socket location (any ROM operates in any socket), Tektronix has assigned permanent socket locations to the operating system, diagnostic, and option firmware. Sockets CS95 -- CS9F contain the 8540 operating system, and sockets CS92 -- CS94 contain the 8540 diagnostics. The remaining sockets are available to accept option firmware. This arrangement is shown in Fig. 3-4. Install your TTA Option into locations CS8C, CS8D, and CS8E, or any other available sockets within the reserved 8540 option locations.

#### NOTE

The number of available option sockets is limited. If you don't have enough room to install firmware for a particular option, remove unused option firmware.

### ROM Socket Strapping

Since all presently available 8540 option firmware is stored in 2764 devices, the strapping associated with each socket needs no changing.

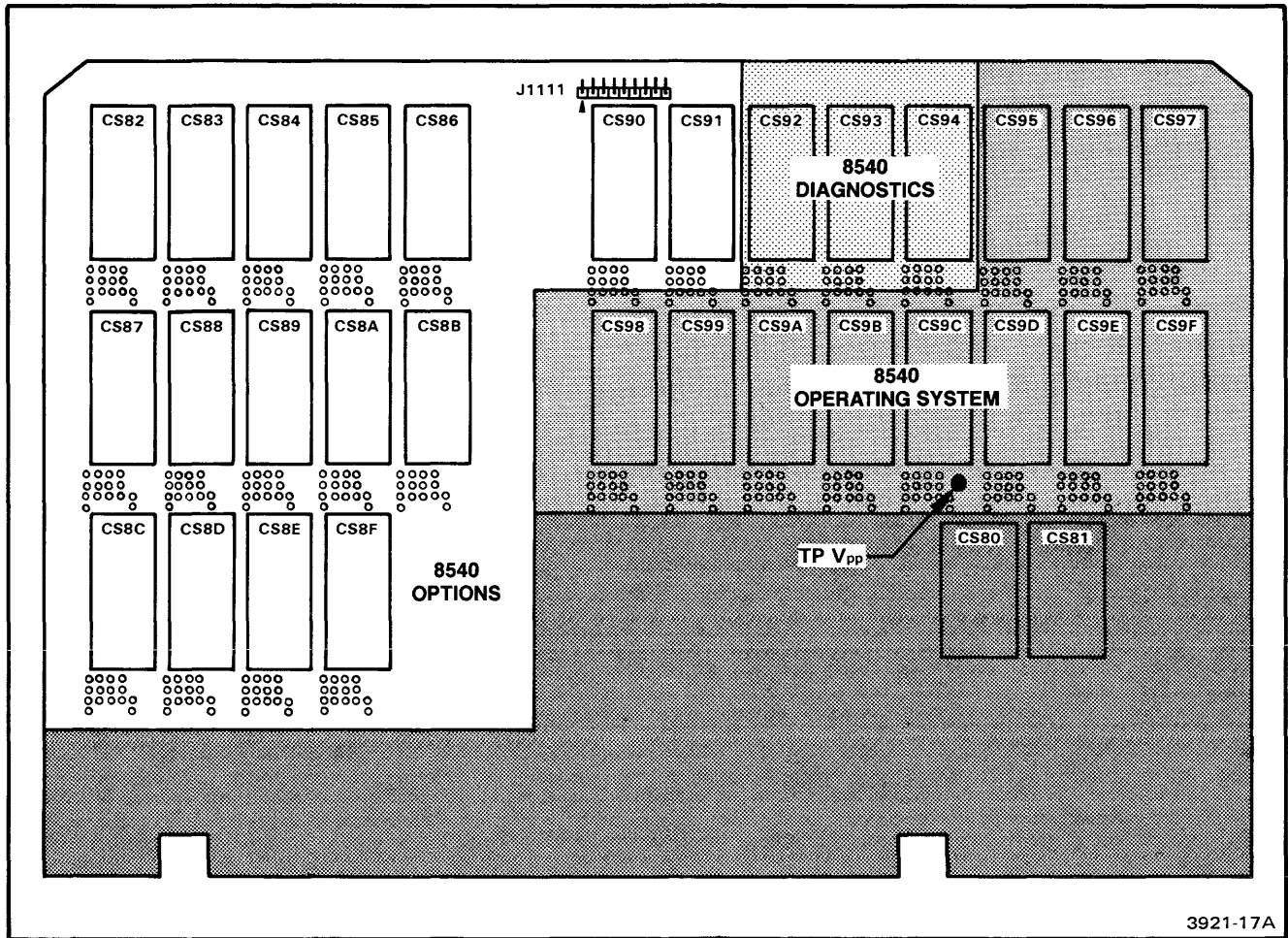


Fig. 3-4. System ROM board socket locations.

Section 4PERFORMANCE VERIFICATIONINTRODUCTION

This section describes the procedures to verify that the Trigger Trace Analyzer operates properly in conjunction with your development system.

TTA/8550 PERFORMANCE VERIFICATION

With the 8550 Microcomputer Development Lab, the performance of the TTA is verified by running the 8550 system's disc-based diagnostics. That is, when the system diagnostics for the 8550 Microcomputer Development Lab are executed in the "RUN ALL" mode, the TTA is detected and tested. Refer to the Verification section of the 8550 Microcomputer Development Lab Installation Guide for the procedure to execute these system diagnostics. If an error message indicates that the TTA failed system diagnostics, contact authorized repair personnel.

TTA/8540 PERFORMANCE VERIFICATION

With the 8540 Integration Unit, the performance of the TTA is verified by running the 8540 system's ROM-based diagnostics. That is, when the system diagnostics for the 8540 Integration Unit are executed in the "RUN ALL" mode, the TTA is detected and tested. Refer to the Verification section of the 8540 Integration Unit Installation Guide for the procedure to execute these system diagnostics. If an error message indicates that the TTA failed system diagnostics, contact authorized repair personnel.